'The most complete experiment in army hygiene'

British military reform in sanitation from the Crimea to India,

A comparative account of sanitary reform in the 19th Century

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A thesis submitted in partial fulfilment of the requirements for the

Degree

of Master of Arts in History

University of Canterbury

2017

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Acknowledgements

First and foremost of my acknowledgements is to my primary supervisor Dr Jane Buckingham, for helping me get on to the right track initially with my research, and for her many efforts to get me to present at conferences, and her guidance throughout the writing of this thesis. Next my thanks goes to Dr Evgeny Pavlov my secondary supervisor for his assistance and guidance and proof reading. I would also like to thank the History department of the University of Canterbury for their assistance and funding for the translation of a chapter of the works of Dr Chenu. I would also like to thank Dr Peter Low of the French department for his assistance in translating this work.

Next I must thank those few who helped to keep me sane throughout the long writing and research process. Particularly Hannah Smith and Ruth Larsen, who while sharing an office with me and working on their own Masters Theses, have been a constant source of support. Other than those who kept me sane at university, those who kept me sane at home must also be mentioned, particularly my landlords Ben and Chloe Ellis who allowed me to focus on my research whenever possible.

Finally, I must thank my family for the variety of assistance they have provided me with. My mother, Dr Sandra Richardson, reaps the lion's share of my thanks throughout this time in my life, as my first point of call for proof reading and as someone to discuss my ideas with regularly who was able to provide me with academic feedback, she has been of great help to me. My

father, Nicholas Richardson, I would also like to thank for providing me with financial assistance throughout my studies, and for escorting me through various parts of Northern and Central India in order to help me better contextualise my research.

Abstract

The history of sanitation is not generally considered a glamourous topic. It is far more common to see larger works relating to war, within which sanitation may be present as a footnote to explain those deaths not caused by battle. However, within the 19th Century, death in battle was significantly less common than death from illnesses and diseases associated with army and camp life. Within this thesis the nature of such deaths within the military populations of the British Army is discussed through analysis of two reforms in sanitation, namely the famous sanitary reforms of the Crimean war of 1854-56 and the significantly less well known sanitary reforms of the British Army in India, the official recommendations of which were proposed in 1863. Through examination and comparison of these reforms in sanitation, the efficacy of sanitary reform within this period is revealed. The impact of sanitary reform, although based in part on what is now recognised as flawed theory, in this case environmental miasmatic theory, proved extremely effective in both reducing rates of hospital admission and also the rate of death from various illnesses within both India and the Crimea. This improvement can be seen both on an active military campaign, and within a broader colonial deployment. Reform in sanitation proved to be a significant military asset as it allowed a much greater number of soldiers to be available or active at any time. In both cases reform was spurred on by conflict and supported by the increasing use and collection of medical data and statistics. This collection and use of medical statistics also highlighted the differences in mortality faced by those of different classes. The major differences in the mortality of those in different classes in turn revealed the cause of illness to be conditions of living. As a result of this, the sanitary reforms of the period were generally a call for improved living conditions so that disease could be prevented.

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Introduction

Histories which relate to the military conflicts of the 19th century often have a tendency to focus upon major battles, political causes and other grander elements of a war. In many cases these histories note the number who died throughout the conflict, often without noting the causes. Emphasis is placed on the brave 600 charging into the valley of death, the thin red line boldly standing against a charge or the long drawn out attrition of a siege, culminating in slaughter. This thesis is not an examination of the 'glorious' elements of war. Rather it is an examination of the unglorifiable, but much more frequent causes of death in the wars of the 19th century, and the efforts made to prevent that true scourge of armies, disease. Rather than discussing the strategic blunder that was the sacrifice of the Light Brigade, it should be discussed why, of a brigade of cavalry, only 600 were in a fit condition to charge. The strength of the Light Brigade upon embarkation was 1476 troopers and officers, 299 from the 4th Light Dragoons, 294 from the 13th Light Dragoons, 294 from the 17th Lancers, 295 from the 11th Hussars and 294 from the 8th Hussars.[1] Of this number, only 673 men made the charge, some 804 having already been rendered ineffective or dead, most of these through disease. The 8th Hussars had only 104 of its initial strength able to make the charge due to losses from disease.[2] Death as a result of disease often outstripped mortality from combat and battle by a great deal, yet it is rarely the focus of our

[1] *Medical and Surgical History of the British Army which served in Turkey and the Crimea during the War against Russia in the years 1854-55-56. 2 Vols,* (London, Harrison and Sons, 1858). [Hereafter *Medical and Surgical History, Crimea 1854-55-56*].
[2] *Medical and Surgical History, Crimea 1854-55-56,* pp.50-57.

histories of the wars of the 19th century. This thesis focuses entirely on disease and the war being fought against it by the sanitary movement.

This thesis provides comparison and analysis of the sanitary reforms of the Crimean War of 1854-56 and the British colonial military reforms in sanitation proposed in India in 1863. A comparison of these two particular reforms reveals the progression of the authority of the sanitary movement, through examination of sanitary theory and practice as revealed by these two periods of conflict and reform. In addition to this evidence of a progression between these two reforms, the efficacy of reform is also revealed. Through detailed analysis of statistical evidence, it becomes clear that these reforms in sanitation resulted in significant improvement in the health of the British army, and a clear decline in the rate of mortality in both the Crimea and India. These periods of reform reveal the developing acceptance of sanitary knowledge at both a professional and administrative level, particularly within the context of the British military. Additionally, the timing and nature of these two reforms reveals the role of conflict as an impetus for reform. The Crimean sanitary reforms took place in time of war, and as the direct result of the conflict within which they occurred, whereas the commission which proposed the reforms of 1863 was ordered to do so in 1859, around the end of the Sepoy revolt in India, largely through fear of an inability to maintain colonial authority. In spite of initial resistance to the sanitary recommendations that emerged during the Crimean war, by the beginning of the Indian sanitary reforms and the publication of the 1863 commissioners' report, there is evidence of changing attitudes. Indeed, there is evidence of changing attitudes by the culmination of the Crimean war itself. The statistical evidence and medical data gained during the Crimean war, used as proof of the improvement of the health of the British army, granted the sanitary

commissioners authority backed by evidence of the efficacy of their claims. By the time of the 1863 sanitary commissioners' report, the intellectual authority of sanitary theory is revealed by the degree of influence which sanitary theories had gained. Sanitary theory was now able to challenge previous colonial understanding of the various effects of the climate of India on the health of Europeans. This authority is made apparent in the status and authorisation of the 1863 report, which was commissioned by that highest of offices, that of the Queen of England, Queen Victoria. That the sanitary movement now had its patrons in such high places reveals the extent to which this knowledge was becoming accepted. In addition to this, prominent medical figures of the time were also supporting the underlying concepts, the most influential being Florence Nightingale, whose input or influence can be seen in a number of official documents, including the initial instruction of Queen Victoria.[3]

This examination reveals the causes and efficacy of reform in sanitation within this period, both in the context of an active military campaign, and within a colonial post conflict setting. Additionally, the role of public opinion and media interest is examined as a driving force for reform. Through examination of these reforms, how they took place, and how they were perceived by a number of those present throughout the period, greater understanding of the sanitary movement can be gained. In addition to an understanding of the role of the public health movement, such a comparison also allows for an in-depth discussion of the theory involved, particularly the prevalence of the environmental miasmatic theory. The manner in which reforms were carried out, the specific actions taken reveal the contemporary understanding of illness and

[3] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India: with Precis of Evidence*, (London: George E. Eyre and William Spottiswoode, 1863), [Hereafter *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*] p.5.

the categorisation of disease also reveals the many errors in the understanding of sickness and contagion.

Historiography

This thesis contributes to a number of areas of historiography, including the history of sanitary theory and the history of colonial sanitation. Its broad scope also encompasses elements of the history of military medicine and the development and acceptance within this of sanitation as a relevant element. The specific focus of this thesis is a reflection on reform with relation to sanitation, through the analysis of two specific military reforms as examples. This necessarily limits the scope of the research, as rather than encompassing the broader advancement of sanitary theory in general, the focus is deliberately on sanitary theory within a British administrative and colonial military context. There is little written specifically relating to evidence of the advancement of sanitary theory within this period as evidenced by official documents relating to reform and so this contribution adds an additional perspective to many established areas of medical, colonial, social, and military history.

The approach taken within this thesis has been to examine two specific examples of reform, namely the sanitary reforms of the British Army which took place in the Crimea, and the reforms relating to the sanitation of the British Army in India proposed in 1863. These reforms were enacted from within the administrative framework of the British Military Medical Department, and their comparison highlights the changes in approach to sanitation and sanitary thinking which occurred during this period. The comparison specifically focuses on the contemporary

understanding of disease and those methods which were either used directly, or recommended, in order to lower rates of mortality within the British army. The most compelling area of historiography within which to place this work might then be argued to be within the broader context of public health, particularly colonial public health. However, this field of colonial medical history appears largely to focus on epidemics and tracing them, or on public health from a civil perspective.[4] This research adds to this field by focusing on an examination of military and colonial sanitation and health. Although this examination does not fit entirely into the idea of public health, as it deals specifically with maintaining the health of the military rather than society in general, it still offers a substantial contribution to this field. There is certainly some discussion of military medical health, although much of this appears to attempt to navigate the subject either in its entirety, or particularly as a precursor to the role of sanitation in the First World War.[5] As a result, much of this work examines sanitation in a broader sense, rather than providing specific analysis relating to any one period of reform. As made quite clear within various commissioner's reports, improvements in general public health would also be of significant benefit to the health of the military. This thesis attempts to add to these particular established areas of history, particularly by exploring a largely under examined area of colonial military health.

[4] There are a number of works that focus specifically on cholera and its spread, for example from a geographic perspective Matthew Smallman-Raynor and Andre D. Cliff have written specifically on the spread of cholera during the Crimean war in their article *The Geographical spread of cholera in the Crimean war: epidemic transmission in the camp systems of the British Army of the East, 1854-55*, David Arnold has also written extensively on Epidemic disease within India, notably his work *Cholera and Colonialism in British India*, among many other publications, Muhammad Umair Mushtag also writes an interesting account titled *Public Health in British India: A Brief Account of the History of Medical Services and Disease Prevention in Colonial India*.

[5] A good example of this is the work of SV Thompson, who examines *A Fearsome Enemy (1); A history of sanitation in the British Army 1899-1914.*

This thesis may also be considered through its relation to the historiography of the wars of the 19th century. There has been a great wealth of writing relating to the Crimean war in general, and much of this touches briefly upon the reforms which took place during this period.[6] The same can be said of the historiography of the war of 1857 in India, which also on occasion relates to sanitary reform, as this conflict included a great deal of suffering as a result of disease.[7] Unfortunately, neither of these historiographies focus in detail on theories of sanitation or the methods which were proposed and attempted to reduce deaths from preventable illnesses. These historiographies are however, still vital to any appropriate understanding of the context within which reform of sanitation became possible. This work also contributes to the historiography of Florence Nightingale as it examines the broad extent of her influence within both of these reforms in sanitation, specifically noting the influence she had on the sanitary commission responsible for reform in India. The general historiography of Florence Nightingale focuses upon Nightingale herself as a figure of history, and primarily appears to seek either to villify, humanise, or deify her.[8]

The history of sanitary theory and the hygienist movements of the period are most certainly not exclusive to the British Empire. Indeed, during the Crimean War, medical reform was also

[6] Trevor Royle and Orlando Figes both provide exceptionally well researched and detailed analysis of the Crimean war in its entirety and touch briefly upon sanitary concerns at various points, for other perspectives see Sir E Hamly, Bob Carruthers, David Wetzel and Ann Pottinger Saab. There also exists a wealth of writing on the topic from a Russian perspective, but due to a lack of languages on my part, I am not equipped to make appropriate reccomendations here.

[7] Authors of this conflict are numerous, as the topic is one of significant controversy even now, as can be seen simply by the names which are used to describe the conflict, the two most common being the Indian Mutiny and the Indian War of Independence, Rudrangshu Mukherjee provides an excellent analysis of the conflict, including a detailed analysis of its causes from a social level, for a European perspective, of which there are many, see G.B Malleson, and William Wright.

[8] Look at Hugh Small for a less kind biography of Nightingale and a sharp critique of her role in the Crimea, for a less negative perspective Jharna Ghourlay provides an interesting account of Nightingale's role in attempting to improve public health in India, or for specific detail on Nightingale's role as a statistician see Lynn Mcdonald and Edwin W. Kopf.

occurring within the Russian army, particularly in relation to the use of anaesthesia for amputations and the inclusion of female nurses.[9] After the conflict sanitary reform within the Russian military began in earnest, as much was made of the inability of the Russian army to prevent epidemic outbreaks during the conflict.[10] The French can also be seen to have been attempting to apply the lessons that they had learned in sanitation during the Crimean war, it was, however, unfortunate for them that they were hampered by their rigid administrative system and so the recommendations made by their doctors and medical men went unheeded during the conflict.[11] The notable figures of the British public health and sanitary movements themselves did not formulate their theories from within a vacuum. Nightingale herself received her training and exposure to medical theory from a wide range of professionals; she studied nursing through an apprenticeship at the Kaiserswerth Institute in Germany and indeed received some training relating to sanitation and hospital administration in Paris at the *Maison de la Providence*.[12] The advances being made in sanitation during this period were made across Europe, and indeed across much of the world, including America.[13] Rather than losing focus attempting to examine all of the international movements in sanitation, this thesis instead applies critical analysis on sanitary reform over a shorter period of time and within the context of the British Military Medical Department.

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[9] John Pearn, *Doctors and Nurses in the Crimean War, A perspective of Military Medicine with some contributions of Russian and British doctors and nurses to contemporary medicine, (*St Petersburg, AMAQ Clinical and Scientific Conference, 2005), pp.23-24.

[10] Y. Naumova, "Russian Medical Service During the Crimean War: New Perspectives." *Interdisciplinary Studies in the Long Nineteenth Century* 19 (2015).

[11] Jean Charles Chenu, On the Conservation of Armies on Campaign, pp125 - 153, Translation by Peter Low, Extract from *De la mortalité dans l'armée et des moyens d'économiser la vie humaine : extraits des statistiques médico-chirurgicales des campagnes de Crimée en 1854-1856 et d'Italie en, 1859,* (Paris, Hachette, 1870), pp.133-134.

[12] Edwin W. Kopf, "Florence Nightingale as Statistician", *Publications of the American Statistical Association, Vol. 15,* No, 116, (1916): pp.388-389.

[13] Warren Winkelstein, "The Development of American Public Health, a Commentary: Three Documents That Made an Impact", *Jr. Journal of Public Health Policy*, Vol. 30, No. 1 (2009): pp.40-48.

Methodology

This thesis is divided into five chapters which breaks down the reforms and their causes and interactions into manageable sections. Chapter Two discusses the relevant backgrounds of reform, focusing first on the British Public Health Movement as it related to these reforms. The general background of the Crimean War is then covered, with specific detail relating to the organisational failings which contributed to the need for sanitary reform. Finally, the relevant background of the 1863 recommended reforms in India is examined, particularly the sanitary concerns which arose during and as a result of the Sepoy Rebellion of 1857. This conflict immediately preceded the commission being tasked with gathering data and making recommendations to improve the sanitary state of the British Army in India. Chapter Three provides detailed analysis of the Crimean sanitary reforms through analysis of the first-hand accounts of those present during the conflict and through the official records made by the British Military Medical Department, the records of Florence Nightingale and those of Dr Baudens of the French army. This analysis focuses upon both the conditions which the British Army suffered from during the Crimean War, and the efforts made to limit the high mortality rate from preventable illnesses. Chapter Four focuses on the 1863 sanitary reforms proposed to improve the health of the British army in India. Analysis of official documents and reports reveals the efficacy of the recommendations made within the *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*. Official documents published after the 1863 commissioners' report provide statistical evidence of the successes of the implementation of these recommendations. Chapter Five establishes through comparison of the sanitary

recommendations and theories of disease prevention within the *Medical and surgical History of the British Army which served in Turkey and the Crimea* and the *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India* the continuing and developing influence and authority of the sanitary movement within the British Military Medical Department. By comparing the reforms of the Crimea with those of colonial India, the influence of sanitary figures and sanitary theory is made clear, particularly that of Nightingale. The continuing influence and advantage of medical statistics is also made clear through this comparison.

The primary source material is made up of several key elements. These include accounts of notable individuals and medical professionals who advanced this ideology within a British context. A collection of official documents created for the purpose of either understanding and recording rates of mortality and the course of disease, or to devise ways to decrease mortality rates through illnesses are also included. In addition to these, there are the collected accounts of those who experienced the sanitary reforms within this period, either as active participants in reform, or as passive witnesses during time of reform whose responsibilities were elsewhere. These sources, alongside printed newspaper articles from the period, make up the bulk of the primary source material used to display the growing influence of sanitary theory within the period.

The first-hand accounts of those who were involved in sanitary reform and the conflicts within which such reforms took place offer considerable insights into the history of these reforms. These accounts reveal the conditions which necessitated such reform from multiple personal

perspectives. Several of the available personal accounts have been used, those selected were chosen in order to provide a range of views from people with different backgrounds. The primary sources used here can be divided into three categories; sources which relate specifically to the important thinkers and reformers of the British Public Health Movement, sources present during or involved in the reforms of the Crimean War, or sources present during or involved in the proposed 1863 Indian sanitary reforms. The accounts of Florence Nightingale provide the most significant individual perspective, as her role as a prominent reformer and administrator allowed her to not simply report her own views, but also to compile medical and sanitary data and make recommendations from them.[14] Additionally, Nightingale can be seen to fit into all these categories, as a great proponent of public health, the key reformer of the Crimea, and one of the key sources relating to sanitary reform in India. Indeed, her work and data are of vital importance for any study of the Crimean sanitary reforms, and to a lesser extent, her compiled information is also essential for an in-depth study of the reforms in Indian sanitation.

Of the primary source material relating to the British Public Health Movement, the work of Edwin Chadwick[15] comes to the fore.[16] Chadwick, a noted reformer of public health, wrote

[14] Florence Nightingale, *Notes on Matters affecting the Health, Efficiency, and Hospital Administration of the British Army, founded chiefly on the experience of the late war*, (London, Harrison and Sons, 1858); Florence Nightingale, *Notes on Hospitals*, (London, Savill and Edwards, 1863); Florence Nightingale, *Army Sanitary Administration, and its reform under the late Lord Herbert,* (London, Mc Corquodale & co, 1862); Florence Nightingale, *Observations on the evidence contained in the Stational Reports submitted to her by the Royal Commission of the Sanitary State of the Army in India*, (London, Edward Stanford, 1863); Florence Nightingale, *Subsidiary Notes as to the introduction of Female Nursing into Military Hospitals in peace and in war,* (London, Harrison and sons, 1858).

[15] *Report to her Majesty's Principal Secretary of State for the Home Department, from the Poor Law Commissioners, On an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain; with Appendices.* [Chadwick, Edwin, *Report on the Sanitary Condition of the Labouring Population of Great Britain,*] (London, W. Clowes and Sons, 1842), [hereafter Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*] p.369.

[16] There are a significant number of other important sanitary thinkers from this period, including John Snow who pioneered waterbourne theories of epidemiology, Southwood Smith who was a major influence on the sanitary movement and influence on Chadwick and William Farr who compiled and connected several branching areas of

several reports relating to the illnesses which afflicted the common people of Britain. His detailed accounts of the methods needed to prevent disease amongst the population of Britain provide great insight into the active measures being taken by the public health and sanitary reformers in Britain at the time. His *Report on the Sanitary Condition of the Labouring Population and on The Means of its Improvement* in particular reveals his work with statistical evidence in order to legitimise the theories which he was advancing at the time. Alongside Chadwick and Nightingale the works of a later figure, Ranald Martin are also used to reveal the state of medical theory. Ranald Martin's work *The Influence of Tropical Climates in Producing the Acute Endemic Diseases of Europeans*[17] displays in detail many of the theories understood through colonial medical practice. He also provides detailed medical descriptions of a great variety of diseases and illnesses, and as a result proves an invaluable source relating to the understanding of contemporary views of medicine. This thesis also draws from other medical publications from the period and in doing so this allows it to better contextualise the sanitary and public health movements. The medical publications drawn from include medical journals such as *The Lancet*, the *Provincial Medical & Surgical Journal* and *British Medical Journal*.[18]

Alongside Nightingale in the Crimea, this thesis has used several accounts of various members of the British Army's medical staff. Notably *the Crimean Journals of the Sisters of Mercy*[19] several of which record accounts of the experiences of the Sisters of Mercy and their time working within the general hospitals of the Crimea, primarily those hospitals at Scutari and

sanitary theory. Edwin Chadwick however is particularly notable due to his contributions to British public health at an administrative level.

[17] Ranald Martin, *The Influence of Tropical Climates in Producing the Acute Endemic Diseases of Europeans,* second edition, (London, John Churchill, 1861), [Hereafter, Ranald Martin, *The Influence of Tropical Climates*].

[18] British Medical Journal, The Lancet, Provincial Medical & Surgical Journal.

[19] *The Crimean Journals of the Sisters of Mercy 1854-1856,* edited by Mari Luddy, (Dublin, Four Courts Press, 2004).

Koulali near Constantinople. These accounts provide a rival medical account to those of Nightingale, as there were significant tensions between Nightingale and her working class nurses and the generally middle class Sisters of Mercy,[20] for whom nursing was a religious duty rather than a profession. Indeed, the Sisters of Mercy sought aid within the existing administration of the British Military Medical Department to avoid being under the authority of Nightingale within the Crimea, and when they failed to achieve this, they resigned.[21] They often communicated with Sir John Hall, Inspector General of Hospitals in the Crimea. Sir John Hall opposed Nightingale's nurses as a general principle, believing that efficient military nursing could only be achieved either through religious duty or affection, and that Nightingale's nurses simply worked for pay.[22] However, as Nightingale and Hall had to work together, as Nightingale was granted final say over the nurses of the Crimea, and Hall effectively had charge of the medical department there,[23] their surviving letters to one another are exceptionally polite and civil.[24] Alongside these medical figures, the accounts of the Lady volunteer nurses are also used, particularly *Eastern Hospitals and English Nurses; the Narrative of twelve months experience in the Hospitals of Koulali and Scutari* written by 'A Lady Volunteer'.[25] This Lady volunteer is generally identified as Mary Magdelen Taylor, who was one of a number of Lady volunteers in the Crimea. These lady volunteers went to assist with nursing within the Crimea, although their role was somewhat controversial at times. These Lady nurses differed from the Sisters of Mercy and Nightingale's nurses as they generally lacked training and were of a higher social status than either, being the

[20] Deirdre M. Bryan, "*A "Peculiarly Fitting" Institute: The Origins of Marie Martin's Medical Missionaries of Mary" (PhD diss., Boston College*, 2007), p.30.
[21] *The Crimean Journals of the Sisters of Mercy*, pp.222-223.
[22] S. M. Mitra, *The Life and Letters of Sir John Hall, M.D., K.C.B., F.R.C.S.* 1911, (London, Longmans, Green and Co. 1911), pp.376-378.
[23] *The Crimean Journals of the Sisters of Mercy*, p.222.
[24] S. M. Mitra, *The Life and Letters of Sir John Hall*, p.434.
[25] *Eastern Hospitals and English Nurses: the narrative of twelve months' experience in the Hospitals of Koulali and Scutari. By a Lady Volunteer*, Second edition, Vol II, (London, Hurst and Blackett, 1856).

volunteers from wealthy families.[26] Taylor wrote in limited detail of her experience relating to the medical functions of her role, although her accounts of the conditions within which she worked show more detail. Taylor wrote quite scathingly of the nurses employed by Nightingale and what she viewed as their scandalous habits and drunkenness. Taylor specifically noted that: "Attention has been drawn towards the class of women whose job it was to nurse the sick of England. These pages will in some degree show how unfitted they are for that responsible office."[27] She also wrote of the great work and devotion of the Sisters of Mercy.[28] Indeed, in this way we see more of the class divide between the nurses of the Crimea. These Lady nurses were not free from criticism themselves however, as they were often noted to have been unwilling to do some of the more menial work associated with the role of a nurse, and their social rank meant that they were not always considered capable of the appropriate discipline required in a hospital role.[29] Sister M. Aloysious Doyle noted of the Lady nurses that: "They admit they know nothing about nursing, many of them never having seen a dead person, or perhaps, been in a sick room."[30]

Of the medical accounts of the Crimea, those of the various nursing groups are but one facet. The letters of Dr Douglas Reid were also of great use in understanding the conditions of the Crimea.[31] Dr Reid wrote as an assistant surgeon attached to the 90th Regiment of the Light

[26] Anne Summers, "Pride and Prejudice: Ladies and Nurses in the Crimean War", *History Workshop*, No. 16 (1983): pp.33-34.
[27] *Eastern Hospitals and English Nurses*, p.267.
[28] *Eastern Hospitals and English Nurses*, pp.225-227.
[29] Anne Summers, "Pride and Prejudice: Ladies and Nurses in the Crimean War", *History Workshop*, No. 16 (1983): p.45; Florence Nightingale, *Subsidiary Notes as to the introduction of Female Nursing into Military Hospitals in peace and in war*, (London, Harrison and sons, 1858) pp.4-5.
[30] *The Crimean Journals of the Sisters of Mercy*, p.28.
[31] Joseph O. Baylen and Alan Conway, *Soldier-Surgeon: The Crimean War Letters of Dr. Douglas A. Reid, 1855-1856*, (Tennessee, The University of Tennessee Press, 1968), [Hereafter J. Baylen and A. Conway, The Crimean War Letters of Dr. Douglas A. Reid].

division, and although not being with the army until February of 1855, his letters provide a detailed account of the sicknesses and conditions afflicting his regiment. Additionally, as Reid himself was taken ill at one point and sent to the hospitals at Scutari, where he ended up working briefly while he was supposed to be recovering from his illness, he is also able to provide further perspective regarding the organisation and running of the hospitals around Constantinople.[32] In addition to these personal accounts of medical officers and nurses, the report of the *Medical and Surgical History of the British Army which served in Turkey and the Crimea*[33] provides official accounts from a number of medical officers, including analysis of the course of various diseases, and full regimental histories of illnesses within the conflict. These documents include a thorough official analysis of all that the British Military Medical Department thought relevant or necessary to be recorded so that the high mortality rate of the Crimean War could be avoided in future. As a result of this, the information contained within this report is very detailed. From the first volume of this report, which contains individual regimental histories, those of the 5th Dragoon Guards and those of the 1st Coldstream Guards have been examined in depth. In this manner the medical records of both Infantry and Cavalry who served throughout the conflict can be examined. A supporting account is also gained through the personal records of Temple Godman, a young lieutenant in the 25th Dragoon Guards, who was to achieve the rank of captain during the conflict.[34] Godman's accounts give additional information on the health and conditions faced by his regiment, and also an officer's perspective of the whole affair. Another account used is that of the Reverend Sydney Osborne[35] who, amongst his other good works, assisted at the hospitals of Scutari, both by assisting with acquiring necessary supplies for Nightingale and through his

[32] J. Baylen and A. Conway, The Crimean War Letters of Dr. Douglas A. Reid, pp.106-107.
[33] *Medical and Surgical History, Crimea 1854-55-56, Vol. I and II.*
[34] Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* (Cox and Wyman, 1977).
[35] Sydney Osborne, *Scutari and its Hospitals,* (London, Dickinson Brothers, 1855).

physical efforts. Osborne upon reading about the conditions of the British hospitals of the Crimean War, set out to discover their true state. Indeed, Osborne considered himself to be particularly qualified for such a task as he states that:

> I went upon my self-imposed mission, altogether unfettered, I had nothing to gain from any one particular course of conduct. I sought the truth, and took my own way to arrive at it. Whether that truth would please or displease the public, or the government, was to me a matter of indifference; I had nothing to fear or gain from either.[36]

As such, Osborne's accounts of conditions and the competence of those involved lack some of the inherent bias of those serving within the administration, or those reporting upon the war. That noted, Osborne's views are very strong and his perspective regarding the army and parliament is a source of his scathing commentary of the army's overall administration. His particular qualification to make such broad judgments regarding vast administrative political and military matters can certainly be questioned. In spite of this, Osborne proves an interesting and quite unique perspective of events. The accounts of William H. Russel of *The Times* newspaper are also used in places, as he wrote prolifically about the conflict, both during the war and afterwards.[37] Russel's writing is particularly valuable, both as he was writing as a first-hand observer in many cases, and because his role as *The Times* correspondent meant that his record of the conflict was one of the major forces shaping public knowledge and opinion. Many of the

[36] Sydney Osborne, Scutari and its Hospitals, p.v.
[37] Sir William Howard Russel, *The British Expedition to the Crimea*, (London, George Routledge and Sons, 1877); William Howard Russel, *Complete History of the Russian War from its Commencement to its Close,* (Toronto, Bostwick & Barnard, 1856), p.64.

events Russel presents are described in the exceptional detail of a witness whose primary role it is to record events rather than that of a distracted participant. Russel's records however, have some issue with relation to the figures he gives for deaths and mortality, often seeming somewhat careless and happy to round figures as he saw fit, generally to the nearest thousand. An example of this is seen in his work *The British Expedition to the Crimea* which he published in 1877.[38] In this Russel notes that the 3000 men of the Foot Guards had above 600 soldiers unable to march in August of 1854; although Russel's point remains apt, the official figures place the overall strength of the regiment at this time, as a result of deaths already having occurred at 2737 out of an initial dispatch strength of 2898 men and officers, of this number, within the month of August, there were some 805 hospital admissions.[39] Although in this case his figures appear quite close to the official records, his apparent desire for easy figures weakens his use as a source for medical statistics. That noted, this is not necessarily a weakness in Russel's work, as his intent is to describe the affairs of the war, not provide exact and clear details of mortality. Russel is not the only source used from *The Times* however, as in addition to the work of other correspondents writing from Constantinople, *The Times* also published letters from the army, and from those whose family was serving at the front. As a result, *The Times* Digital Archive[40] has been an excellent resource in allowing a greater understanding of public sentiment and some of the issues which outraged the British public.

In addition to the English sources available relating to the Crimean War, this thesis also draws an additional account from two published French sources. The first being the records of Dr Jean-

[38] *Sir William Howard Russel, The British Expedition to the Crimea*.
[39] *Sir William Howard Russel, The British Expedition to the Crimea,* p.64.
[40] *The Times Digital Archive* 1785-2010, Date accessed 11/10/2015 https://christchurch.bibliocommons.com/item/show/414553037_the_times_digital_archive_1785-2010.

Baptiste Louis Baudens,[41] who served with the French Army during the Crimean War as their Medical Inspector to Corsica, Italy, and the Crimea. Dr Baudens wrote prolifically on the subject of military and hospital surgery, and his records of his time in the Crimea reflect this.[42] The translation used by this thesis was initially made for the United States army medical departments use in 1862. Baudens' account discusses the French perspective of medical theory during the conflict in detail, although Baudens provides little in the way of complete medical statistics. To make up for this slight deficiency, the accounts of Dr Jean Charles Chenu are drawn upon.[43] Chenu provides quite detailed and advanced statistical analysis of the medical data of the conflict. Chenu's statistical analysis was considered to be of some authority, a number of contemporary sources lauding his work. Within *The Advocate of Peace* in 1869 Chenu's report is described favourably: "This valuable document possesses the double merit of being official and scientific; it emanates, in fact, from the Ministry of War, and obtained from the Academy of Sciences the grand prize for Statistics."[44] There was some difficulty in acquiring an English translation of the work of Dr Chenu, however with the assistance of Dr Peter Low a translation of the chapter 'On the Conservation of Armies on Campaign' was made available.[45] This chapter discusses the comparative mortality of the French and British armies in the Crimea, with supporting statistical data. Chenu's account also discusses what he perceived to be the strengths and weaknesses of the French and British medical departments during this conflict, and his

[41] L. Baudens, *On Military and Camp Hospitals and the Health of Troops in the Field: being the results of a Commission to Inspect the Sanitary Arrangements of the French Army, and Incidentally of other Armies in the Crimean War*, (New York, Bailliere Brothers, 1862). [Hereafter, L. Baudens, On Military and Camp Hospitals, of the French Army].
[42] *L. Baudens, On Military and Camp Hospitals, of the French Army,* p.vii-xii.
[43] Jean Charles Chenu, On the Conservation of Armies on Campaign.
[44] "Crimean War. Chapter I. Loss of Life in Different ways", *Advocate of Peace*, Vol. 1, No. 7 (1869): pp.106-107.
[45] Jean Charles Chenu, *On the Conservation of Armies on Campaign*.

additional viewpoint proved to be of great use in providing a more in-depth understanding of the health and conditions of the British Army.

The major primary sources used to discuss the 1863 proposed Indian reforms in military sanitation are primarily official documents. The most important of which is the *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India.*[46] This report, published at the official request of Queen Victoria by a board of experts, outlines a complete proposal of recommendations intended to lower the rate of mortality within the British army serving in India. The board itself which was initially appointed underwent some changes after its instigation, and indeed, three of those specifically requested by Queen Victoria to undertake this work were unable to see this project to its completion. Lord Sidney Herbert, the first chairman of the committee, died prior to its completion after having to delay it due to his other duties and ill health. Major General Sir Robert Vivian withdrew due to his other duties taking precedence, and Thomas Alexander, who was the Director-General of the Army Medical Department also died prior to the report's completion. As a result, of the initial eight men appointed to this task, only five were able to remain with the project, and those replaced were in particularly senior positions.[47] Sir Ranald Martin was one of those who was not replaced and was present through the course of the report. Much of the work Ranald Martin later published relating to sanitation in India can be seen to have been drawn directly from the report itself, often quoted word for word.[48] Its primary weakness as a source for the examination of reform however, is that it gives

[46] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India: with Precis of Evidence*, (London: George E. Eyre and William Spottiswoode, 1863).
[47] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India: with Precis of Evidence*, (London: George E. Eyre and William Spottiswoode, 1863), p.3-7.
[48] Sir J. Ranald Martin, "The Sanitary History of the British Army in India, Past and Present, no. I. General observations" *The Lancet*, January 4th (1868).

only a proposal, unlike the *Medical and Surgical History of the British Army which served in Turkey and the Crimea*, this document is unable to provide any evidence for the efficacy of its reforms. Additionally, as it was published prior to any significant action being taken, it is unclear which recommendations were accepted, and which were acted upon. In order to attempt to clarify the efficacy of this proposed reform, later documents had to be used. For this purpose, several other official reports have been examined in-depth including *Vital Statistics of the Bengal Presidency, Sickness and Mortality in the European Army of the Bengal Presidency from 1870 to 1879: an aggregate of the Statistics of the Ten Year Period*[49] and the *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay directed by the Sanitary Commissioner in the Years 1875 and 1876.*[50] These two reports provide significant evidence to examine both the extent to which reforms were undertaken, and the efficacy of these reforms. One report examines a ten year period of reports which provides medical statistics for the period of 1870-1879 and compares them with similar figures from 1860 – 1869. In this manner, the degree of improvement in health within the Bengal Presidency is revealed, and as such, the efficacy of reform can be examined. The scope of this report presents some limitations however, as its focus, and indeed the majority of the medical statistics it provides relates only to the area contained within the Bengal Presidency. In spite of this limitation, the information provided is detailed regarding the Bengal Presidency, if less so relating to other areas of India. The second of these reports, which discusses the health of the military and civil stations of the Bombay Presidency, provides a perspective relating to a different area of India, but more importantly, it

[49] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency: Sickness and Mortality in the European Army of the Bengal Presidency from 1870 to 1879: an aggregate of the Statistics of the Ten Year Period*, (Simla, Government Central Branch Press, 1882).
[50] *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay directed by the Sanitary Commissioner in the Years 1875 and 1876,* (Bombay, Government Central Press, 1877).

provides detailed reports from sanitary commissioners relating to individual stations within the presidency, along with official correspondence discussing these reports. This information includes recommendations made, and official responses. In addition to these reports, there are the somewhat less official reports of Florence Nightingale, which directly examine military sanitation in India, particularly barrack and hospital construction and the way in which these facilities ought to be administered and patients tended.[51] The recommendations of the reports of Nightingale reveal the continuing influence of the lessons learned within the Crimea and the relevance which they maintained within colonial Indian administration.

In addition to these detailed reports, several first-hand accounts from those present immediately prior to these reforms have been examined. In particular, accounts of those who suffered through the period of strife leading up to these reforms are examined – that is, the 1857 Sepoy Rebellion. The accounts of those who were involved in the Rebellion are numerous, although the number which do more than briefly mention sanitary conditions are few, and almost entirely British. Of these accounts, attention has been given to those which deal with the issue of cholera during the conflict. Of particular note is the account of Mowbray Thompson,[52] who, distinguished as one of four British survivors of the siege of Kanpur, provides a detailed account of conditions throughout his participation in events. His accounts detail the conditions faced by the garrison and families who were besieged within the cantonment at Kanpur, and also the conditions faced by the army sent to relieve the British residency at Lucknow which was also under siege. While Thompson was a soldier and not a medical man, he still provides some detail relating to causes

[51] Florence Nightingale, *Notes on Hospitals,* (London, Savill and Edwards, 1863), p.151.
[52] Mowbray Thompson, *The Cawnpore Man: A first hand account of the siege and massacre during the Indian mutiny by one of four survivors,* (Lenaur Books, 2008).

of death within the army, and the prevalence of disease during the conflict. Supporting Thompson's account is that of James Fairweather,[53] who served with the 4th Punjab Native Infantry as a surgeon. Fairweather places little emphasis on disease, although he does mention occurrences and outbreaks at various points. Fairweather's account, however, reveals more about the state of mind of those enduring the rebellion, and the apparent acceptance of death through disease as an inevitable part of the conflict. Similarly, the anonymous *A Lady's Diary of the siege of Lucknow*,[54] which records the experiences of an English woman who was caught up in the Lucknow residency during the siege, often reports deaths from cholera or disease quite curtly. Unfortunately, an Indian perspective of the suffering caused by a lack of sanitary measures during this conflict has not been found.[55]

Through careful analysis of these sources this thesis is able to present a strong case, backed by statistical evidence, that the sanitary reforms enacted within this period were largely successful in lowering the mortality rate of the British army, both during the Crimean War and in India. The rate of mortality within both of these examples is shown to drop significantly after reform in sanitation. In addition, this thesis makes clear the continuing legacy of the British Public Health Movement within both of these reforms. This is made apparent through the overall theoretical framework which underpinned reform, and the individuals directly involved in this. The role of conflict as an impetus for reform is also made evident, as in both of these examples of reform,

[53] William Wright, *Through the Indian Mutiny: the Memoirs of James Fairweather. 4th Punjab Native Infantry 1857-1858*, (Gloucestershire, Spellmount military memoirs, 2011).
[54] *A Lady's Diary of the Siege of Lucknow: Written for the perusal of friends at home*, (London, John Murray, 1858).
[55] Mahmood Farooqui's book, *Besieged, Voices from Delhi, 1857*, (New Delhi, Penguin books, 2010), does grant some information relating to the temporary Indian administration in Delhi before the city was reconquered by the British in the form of translations of official communications made by this administration. These communications include official requests relating to hospital supply, payment of hospital staff and care for the wounded, but unfortunately does not offer detail relating to the goings on within these hospitals or the diseases experienced.

conflict was a driving force. This is very clear in the example of the war in the Crimea, where a lack of adequate sanitation was causing the army numerous problems, but also in India, where the reforms were driven by the fear of further conflict after the Sepoy Rebellion of 1857. Class also played a role in sanitary reforms, as can be seen through the hierarchy which developed amongst those involved in reform. This is particularly clear in the case of the various nursing groups in the Crimea and their conflicts and interactions. Class also influenced the rates of mortality and hospital admission due to disease, and the clear imbalance in these figures between those of lower classes and those in higher allowed the sanitary commissioners to draw clear evidence that differences in conditions led to differences in rate of mortality. The acceptance of environmental miasmatic theory and its justification through detailed statistical analysis reveals the acceptance of sanitary theory and the demonstrable benefits to be gained from reform in sanitation. Comparison of these two reforms also reveals the clear progression of sanitary knowledge between the reforms of the Crimean War and those of India, particularly the authority which sanitary theory gained as a result of the Crimean War and the evidence gathered there of its efficacy.

Chapter 2, Primary Causes of Reform

"the annual loss of life from filth and bad ventilation are greater than the loss from death or wounds in any wars in which the country has been engaged in modern times." Edwin Chadwick[56]

Introduction

The 19th century was a period of advancement in sanitary theory. By the middle of this century British sanitary knowledge reached a tipping point, where the weight of evidence led even that most lumbering of beasts, the British Military Medical Department, to take notice. Sanitary reform in this case refers not only to effluent and waste, but to an entire theory for the prevention of disease. Indeed, under the purview of sanitary reform can be seen reform in hygiene, living conditions, diets and any number of other actions taken which may prevent the spread or severity of epidemic disease. There were many events which led to the British military's reforms in sanitation during the 19th century. For the purposes of this thesis, three in particular are examined, as they relate to the two particular reforms being examined. The advancement in sanitary knowledge was the first and most important cause for sanitary reform. The advances being made by the British Public Health Movement were of particular significance to the Crimean and Indian sanitary reforms. This movement established clear evidence of the ability of good sanitary policy and practice to minimise loss of life. The sanitary movement advanced significantly as a direct result of warfare in the nineteenth century. The Crimean War provided a

[56] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, p.369.

platform upon which reform became not only desirable, but necessary and demanded by public outcry. Although not necessarily a direct demand for a reform in sanitation, reactions to the terrible conditions faced by the British army during this conflict demanded action of some sort be taken. Conflict here was the clear impetus for military medical reform. Shortly after this conflict concluded another occurred, the Sepoy Rebellion of 1857 in India which so shocked the British colonial administration that they began to fear that they may not be able to maintain hold of their Indian possessions. This in turn led to frantic pushes for sanitary reform so that the army which controlled India and protected British interests there could be maintained. This proposed sanitary reform would also decrease the significant costs of replacing the great number of soldiers who died from illness and disease.

The British Public Health Movement

The theories which led to these sanitary reforms and subsequent improvements stemmed from a variety of sources. The most relevant of these sources of sanitary theory to the British military medical reforms, is the British Public Health Movement. The British Public Health Movement itself is a vast topic, and encompasses such figures as William Farr, Thomas Southwood Smith, Edwin Chadwick, John Snow and Florence Nightingale. This movement was, much like the later military reforms, a response to trying times. The British Public Health Movement can be seen to have been an attempt to alleviate the suffering of the people of Britain. With significant epidemic diseases causing great loss of life in the major urban cities of Britain, several attempts were made to prevent such disease. This rising movement embraced statistical evidence to support its theories, and to provide tangible evidence for the efficacy of the policies it established.

Unfortunately, little was known regarding the origin of disease, indeed, various schools of thought debated intensely from many perspectives, with theories of contagion and those of epidemic disease prevalent. The conflict primarily being what in particular was the origin of disease, either contagion, passed on from person to person, contamination, passed on from the ill to the environment or environmental, the concept that unhealthy environments were the primary cause of disease.[57] This is of course a terribly simplified account of very complex theories, each of which had minor differences even within themselves, however, within the scope of this work, a full analysis of these early theories is not possible. The theory which appears to have most influenced the British Public Health Movement, was the environmental miasmatic theory. Many of these sanitary theorists were closely linked, Edwin Chadwick and Florence Nightingale in particular corresponded regularly with one another.[58] However, the primary link between Southwood Smith, Chadwick and Nightingale is their acceptance and utilisation of environmental miasmatic theory to justify their sanitary and hygienic theories.[59] John Snow alternatively relied more on a waterborne theory of contagion, at one point theorising that the cause of cholera may be a fungus, Snow also justified his theories through the use of statistical evidence.[60]

The sanitary movement was initially represented by a minority of medical professionals who challenged the prevailing conception that disease was a product of imbalances in the body. [61]

[57] Margeret Pelling, *Cholera, Fever and English Medicine 1825 – 1865*, (Oxford, Oxford University Press, 1978), pp.20-25.
[58] Jharna Gourlay, *Florence Nightingale and the Health of the Raj*, (Aldershot, Ashgate, 2003), p.15.
[59] Jharna Gourlay, *Florence Nightingale and the Health of the Raj*, p.15; Margeret Pelling, *Cholera, Fever and English Medicine*, pp.23-25.
[60] Margeret Pelling, *Cholera, Fever and English Medicine*, pp.216-218; Laura Ball, "Cholera and the Pump on Broad Street: The Life and Legacy of John Snow", *The History Teacher*, Vol. 43, No. 1 (2009): pp.105-119.
[61] Margeret Pelling, *Cholera, Fever and English Medicine*, pp.15-17.

Indeed, this form of humoralism was still being lauded even shortly before the war in the Crimea. Dr John Addington Symonds stated in 1851 during his address to the annual meeting of the Bath and Bristol Branch of the Provincial Medical and Surgical Association that:

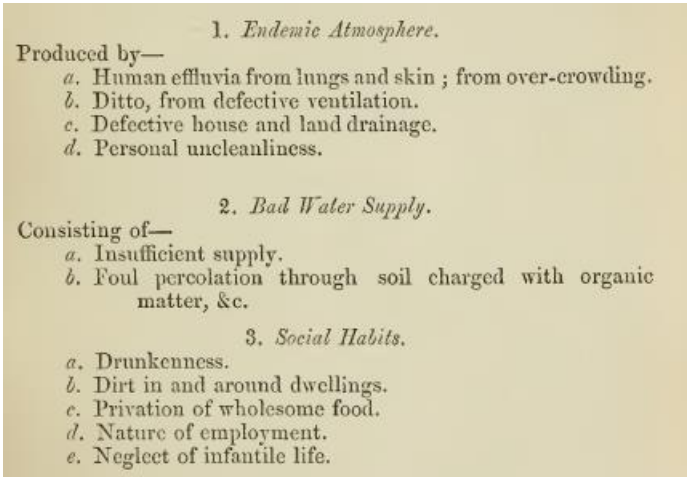
> In pathology there are certain ideas to which we have become so habituated, and which have so grown with our growth, that we have become unconscious of, or have forgotten, the recent date of their origin. Such is the humoralism of our present time; a formula of which medical thought cannot now divest itself.[62]

The statistical evidence which those practitioners of the sanitary movement collected provided justification for the argument that disease could be the result of external causes. This can be seen clearly in the meticulous record keeping of Florence Nightingale during her time as superintendent nursing administrator in the hospitals of the Crimea, along with the records of Edwin Chadwick and those compiled by the commission appointed to enquire into the sanitary state of the army in India. The argument provided by the sanitarian movement was one of environmental factors causing disease. This was described in terms of miasma, which was generally argued to have been decomposing or putrefying organic matter present in the air which caused illness. Ranald Martin, a major contributor to the 1863 reform proposal for the British army in India, quoted several other medical professionals within his work on tropical medicine as stating that

[62] John Addington Symonds, "Orthodox Medicine; An Address, Delivered at the Annual Meeting of the Bath and Bristol Branch of the Provincial Medical and Surgical Association*"*, *Provincial Medical & Surgical Journal*, Vol. 15, No. 15, (1851), pp.393-397.

> The peculiar odour arising from swampy exhalations and the decomposition of vegetable matter, is very perceptible, and sometimes even offensive…. Here, as might be anticipated, the atmosphere is truly pestilential. "It is under these climactic conditions," says Dr. Southwood Smith "that the worst forms of epidemics are engendered; the most sudden in their attack, the most rapid in their development, the most general in their prevalence, and the most mortal." For the most part, adds the same author, these epidemics are strictly endemic, and are confined to particular regions in which they are engendered.[63]

Miasma was often equated with odours, humidity and poor living conditions. This environmental miasmatic theory placed great emphasis on disease prevention through improving the conditions which were believed to cause disease. Many of these conditions, such as the presence of human waste, improper burial of the deceased as well as water pollution and contamination became the direct focus of the sanitary movement. Ranald Martin gives a table of the 'local causes of disease' which he references as the work of a Mr. Cox.[64] The first of the four primary categories given within this table being 'Endemic atmosphere', which the table declares to have been produced by overcrowding, poor ventilation, poor drainage and personal uncleanliness. Other



1. *Endemic Atmosphere.*

Produced by—
- *a.* Human effluvia from lungs and skin ; from over-crowding.
- *b.* Ditto, from defective ventilation.
- *c.* Defective house and land drainage.
- *d.* Personal uncleanliness.

2. *Bad Water Supply.*

Consisting of—
- *a.* Insufficient supply.
- *b.* Foul percolation through soil charged with organic matter, &c.

3. *Social Habits.*
- *a.* Drunkenness.
- *b.* Dirt in and around dwellings.
- *c.* Privation of wholesome food.
- *d.* Nature of employment.
- *e.* Neglect of infantile life.

Figure 1 Local causes of disease

[63] Ranald Martin, *The Influence of Tropical Climates*, p.36.
[64] Ranald Martin, *The Influence of Tropical Climates*, p.163.

examples apply more specifically to military and civil administrations, particularly the lessening of overcrowding, and improving the ventilation in living areas.[65] These were particularly relevant in terms of hospital and barrack administration. Indeed, ventilation, drainage and removal of refuse were among the primary focuses of the public health movement. Theories of hygiene and diet also played a significant role in British strategies for lessening the threat of disease. The routine washing of patients, particularly those with illnesses involving discharge, along with an improvement in diet to promote health were emphasised as a way in which environmental factors could be improved. Florence Nightingale described the Crimean War as a "striking experiment in army hygiene".[66] Nightingale noted the lessons in hygiene which were learned during the Crimean War and made recommendations based upon these, regarding how such lessons ought to be applied to the remainder of the British army serving at home.[67] The sanitary reforms of the nineteenth century can be seen in a large part to encompass those advances in hygiene prevalent at the time.

Although the environmental misasmatic theory can now be seen to have been incorrect, given we now recognise that disease is not in fact the result of miasma, application of the theory itself still prevented much loss of life. The admission of external factors causing illness was part of a progression towards a clearer understanding of the nature of epidemic disease.[68] Many of the methods used to reduce this risk of dangerous miasmas were effective in reducing the frequency and severity of epidemic disease. The preventative measures proposed by the sanitary movement and its reformers were beneficial in spite of the problems in theory. Several examples of this are

[65] Jharna Gourlay, *Florence Nightingale and the Health of the Raj,* p.15.
[66] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.494.
[67] *Florence Nightingale, Health, Efficiency, and Hospital Administration of the British Army,* p.522 and pp.544-545.
[68] Margeret Pelling, *Cholera, Fever and English Medicine*, pp.59-61.

clear, including the proposal to help fight miasmatic malaria by draining swampy soil and land. The theoretical justification was to prevent water evaporating into a malarial fog which may allow decomposing organic matter to be inhaled. This action was still an effective method of fighting malaria, as it removed breeding grounds for malaria's primary carrier, the mosquito.[69] Other examples of the success of the miasmatic theory in fighting epidemic disease are evident in the methods used to treat patients with potentially contagious illness, that is to say, keeping patients clean, making sure that they have adequate ventilation, preventing overcrowding of hospital wards, and in many cases ensuring a supply of clean water and wholesome food. These methods practised by the early sanitary movement's social reformers were clearly effective. This is identified in the evidence provided in recorded statistics, and many of these methods are in line with more current medical theory and beliefs regarding sanitation. The progress and theorising of the sanitary movement within England during this time allowed for more progressive theory to be absorbed and utilised at a bureaucratic level as the ideas gained primacy and traction through the use of statistical evidence.

This discussion began to take a less theoretical form within the first half of the 19th Century, particularly with the active civic reforms of Edwin Chadwick. Chadwick's attempt to put his theories into practice are best illustrated with reference to his *Report on the Sanitary Condition of the Labouring Population of Great Britain.*[70] Chadwick made many contributions to public health and sanitary theory during this period. His contributions included serving on multiple boards and assisting with the production of various laws aimed at reducing the suffering of the

[69] Kalinga Tudor Silva, "Mapping of Fevers and Colonising the Body in British Ceylon", *Economic and Political Weekly*, Vol. 43, No. 12/13 (2008): p.43.
[70] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain.*

general population from disease. His report on the Labouring Population in particular grants a great deal of insight into his sanitary method, and indeed the manner in which the sanitary movement justified their theories. One of the most important insights of this report, and again, one which would characterise the sanitary movement, was Chadwick's emphasis not on treatment, but on prevention of disease.[71] Chadwick, in order to make appropriate recommendations, gathered reports of mortality and the causes of death, in rural populations, as well as those military and other official records which he could gather, along with the conditions within which the populations lived.[72] Through this method, Chadwick was able to identify conditions which appeared to cause disease to thrive. As a result, his initial recommendation was that local bodies be granted greater powers to deal with conditions likely to promote ill health, by improving drainage,[73] removing slaughter houses and graveyards from populated areas and through the destruction of pestilential residences.[74]

These records, many of which were compiled at Chadwick's own expense,[75] revealed not only the conditions which Chadwick believed caused disease, but also evidence that the same diseases affected different classes of the population differently.[76] Chadwick noted that those of the labouring classes suffered more greatly from disease than those living in better conditions.[77] Indeed, Chadwick gives multiple examples of the average age of death within various regions, one example being the average age of deceased and number of deaths for Liverpool in the year

[71] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, p.1 and p.211.
[72] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, pp.211- 226.
[73] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, p.80.
[74] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, pp.96-97 and pp.279-286.
[75] Ralph F. Smith, "Narratives of Public Health in Dickens's Journalism: The Trouble with Sanitary Reform", *Literature and Medicine*, Volume 33, Number 1, (2015): p.158.
[76] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, pp.153-154.
[77] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain*, pp.174-175.

1840. Chadwick gives this figure as an average age of 35 years among 'Gentry and professional persons' with a total of 137 deaths among this class within the year. The average age of death among 'Tradesmen and their families' however, Chadwick lists as 22 years, and the number of deaths at 1,738 within this same year. However, for 'Labourers, mechanics, and servants' the average age of the deceased was as low as 15 years old and of this number a recorded 5,597 deaths occurred within this same year. Not only were the figures Chadwick identified troubling, but the trend in death rates between classes was quite consistent across almost all regions.[78] Such inequality in mortality Chadwick attributed to the conditions within which these populations were living, and he considered that these figures revealed that this great loss of life must be preventable with an improvement of conditions.[79] That the conditions faced by the labouring population are the clear result of the conditions within which they live is stated directly by Chadwick, as he notes:

> That the various forms of epidemic, endemic, and other diseases caused, or aggravated, or propagated chiefly amongst the labouring classes by atmospheric impurities produced by decomposing animal and vegetable substances, by damp and filth, and close and overcrowded dwellings prevail amongst the population in every part of the kingdom…. [80]

Chadwick's method of dividing mortality into various class groups can be seen mirrored to some extent in the official reports of *The Commissioners appointed to inquire into the Sanitary State of*

[78] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.162-164.
[79] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.159-160.
[80] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.368-370.

the Army in India. Although not strictly dividing between classes, the divisions they made were between civil servants, officers, cavalry, artillery, infantry and native troops, between such groups there was certainly a class divide.[81] Not only was such a high rate of mortality preventable, but it was also expensive. Chadwick, like the later sanitary commissioners, noted the cost of this mortality rate. Chadwick describes the financial losses of this rate of mortality in terms of years of productivity lost, the cost of upkeep for those dependant on those who died of disease and the social costs accrued through a rise of paupers unable to work within the districts within which such deaths took place.[82] Indeed, Chadwick draws up a 'Fever Bill' for Dundee between the years of 1833 and 1839. The total costs of loss of labour through both sickness and death, and the costs of medicine and treatment Chadwick calculates at £175,676.[83] Chadwick's final conclusion stresses an environmental miasmatic approach to illness, as he noted:

> That such disease, wherever its attacks are frequent, is always found in connexion with the physical circumstances above specified, and that where those circumstances are removed... the frequency of and intensity of such disease is abated; and where the removal of noxious agencies appears to be complete, such disease almost entirely disappears.[84]

This report can be seen to be in form, conclusion, and recommendations to have been of some influence to those military medical reforms later to come. This is particularly evident in the

[81] *Report of the Commissioners appointed to enquire into the Sanitary State of the Army in India; with Précis of Evidence,* (London, George E. Eyre and William Spottiswood, 1863), p.36.
[82] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.188-191.
[83] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.208-209.
[84] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* pp.368-370.

emphasis on ventilation, drainage, and general cleaning, or as Chadwick refers to it 'proper cleansing'.[85]

The use of data and statistics is one of the defining features of the sanitary movement, and such evidence and record keeping was used by Florence Nightingale in even greater detail in her work in both the Crimea and her correspondence work relating to India.[86] Within the Military such record keeping was something of an innovation. Andrew Smith, Director General of the Army Medical Department makes clear the state of medical record keeping prior to the war in the Crimea, noting in May of 1858 that:

> The untoward position in which I found myself led me immediately to require the records of the department to be searched, in a hope that they might, by supplying information in reference to the events which were observed and the wants that arose during the campaigns in Spain and Portugal, afford what under existing circumstances was so greatly needed. The search, however, proved unproductive, as only two or three valueless documents were found, which merely indicated the number of Staff Medical Officers serving in Spain during a few months of 1812.[87]

It is clear from these remarks that such detailed medical data was not routinely collected and applied before this point, even in the case of a prolonged campaign such as the Peninsular war.

[85] Edwin Chadwick, *Report on the Sanitary Condition of the Labouring Population of Great Britain,* p.369.
[86] D. J. Newell, "Present Position and Potential Developments: Some Personal Views: Medical Statistics", *Journal of the Royal Statistical Society.* Series A, Vol. 147, No. 2, (1984): pp.187 – 188.
[87] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.iii.

However, it can be seen that after the reforms of the Crimean War, that statistical analysis had become common practice. This can be seen by the number of surviving commissioner's reports which provide and analyse detailed statistical medical data.[88]

The efforts of these early proponents of the sanitary method, advanced not only the dissemination of sanitary knowledge, but also improved the sanitary infrastructure of Britain. By organizing effective means for the removal of waste, Chadwick was able to bring further authority to his and Southwood Smith's claims regarding the causes of epidemic disease. This advancement in the sanitary infrastructure of Britain provided evidence of the effectiveness of the sanitary method. This evidence granted it authority and justification to be applied over a broader spectrum, including by Nightingale and the Sanitary Commission in the Crimea, and by the Sanitary Commission in India, the benefits of sanitary infrastructure being noted on many occasions within the *Report of the Commissioners Appointed to Enquire into the Sanitary State of the army in India*.

The war in the Crimea

The Anglo French campaigns of the Crimean War were the background within which the demonstrably effective sanitary reforms of Florence Nightingale and the Sanitary Commission took place. These reforms were necessitated by the lack of organisation and preparation of the

[88] *Report of the Commissioners appointed to enquire into the Sanitary State of the Army in India: with Précis of Evidence,* (London, George E. Eyre and William Spottiswood, 1863), pp.171-198; *Report of the Commissioners appointed to inquire into the Regulation affecting the Sanitary Conditions of the Army, the Organisation of Military Hospitals, and the Treatment of the sick and wounded with Evidence and Appendix,* (London, George E. Eyre and William Spottiswood, 1858), pp.467 – 543.

British Military Medical Department. The poor conditions which the British army suffered through were also the result of the British Military's lack of a coherent and consistent plan to enter into war against Russia. The manner in which the logistical concerns of the campaign were organised reveals this disorganisation, as well as a lack of respect for sanitary recommendations made prior to the arrival of the British army in the field. As a final driving force for reform, the newspapers of the day were instrumental in evoking public outcry by revealing the poor conditions which the soldiers of the British army faced in Bulgaria and the Crimea.

The causes of this conflict are generally considered to have been; the arguments between the Orthodox Christian Church and the Catholic Church over the temples and shrines which existed within the confines of the Ottoman Empire, British fears of Russian expansionism, an apparent misunderstanding between Russia and England regarding a potential division of the Ottoman empire as the 'sick man of Europe' and aggressive French posturing to ensure Catholic support for the Emperor Napoleon III. Of these causes, the initial grievances appear to have arisen due to a series of conflicts within the Christian temples of the holy land, particularly grievances over primacy of the Church of the Holy Sepulchre in Jerusalem and the Church of the Nativity in Bethlehem.[89] Eventually these conflicts led to the annexation of the Danubian Principalities of Moldavia and Wallachia by Russia in an attempt to bring some force to bear on the negotiations. After a period of failed negotiations between the great powers of Europe attempting to arbitrate this dispute, war was declared. [90] First in October 1853 the Ottoman Empire gave Russia an

[89] *William Howard Russel, Complete History of the Russian War* pp.12-15; Orlando Figes, *Crimea: The Last Crusade*, (London Penguin books, 2010), p.3.
[90] Trevor Royle, *Crimea: The Great Crimean War 1854 – 1856*, (New York, St Martin's Press, 2000), p.61.

ultimatum to withdraw from the Danubian Principalities.[91] A similar ultimatum was later sent by the French after another failed attempt at negotiation, and upon its refusal the French declared war on the 27th of March 1854, with the British following suit on the 28th.[92]

British involvement however, was not primarily due to the disagreements over the primacy of the holy places of Palestine, indeed, throughout the course of these arguments the British held themselves somewhat aloof. British involvement was a slow and somewhat torturous process, by which they appeared to resist being drawn into the conflict right up until the eventual declaration of war. The primary reason for British interest in the area was the maintenance of several policies based upon the British position that an independent Ottoman Empire best suited British interests within the region. Another prime consideration was, a desire to ensure that Russian expansion did not interfere too strongly with British trade and dominance. Even those sympathetic to the Tsar's cause like Lord Aberdeen, Prime Minister for most of the conflict, was to be drawn into a position which led him to oppose Russian interests.[93] When Aberdeen was eventually drawn into war, he was noted to complain that he felt he had been dragged into war by Lord Palmerston and popular opinion.[94] The complex nature of these political conflicts certainly prevented a coherent and consistent plan of military action, as up until the declaration of war itself, there was conflict as to whether or not Britain should participate at all.

[91] Ann Pottinger Saab, *The Origins of the Crimean Alliance*, (Charlottesville, University Press of Virginia, 1977), p.95.
[92] David Wetzel, *The Crimean War: A Diplomatic History*, (New York, Columbia University Press, 1985), p.87.
[93] Trevor Royle, Crimea: *The Great Crimean War 1854 – 1856*, p.24.
[94] Orlando Figes, *Crimea: The Last Crusade*, pp.8-9; Sir Edward Hamley, *The War in the Crimea*, (London, Seeley and Co. Limited, 1910), p.160.

The manner in which Britain actively involved itself is the most relevant issue here with regards to the sanitary state of its armies, and the reforms which its involvement necessitated. Britain initially planned to become involved primarily in a naval capacity, with a military landing to remove the Russian forces from the Danubian principalities, and later to potentially take Sevastopol. Britain provided a fleet for the defence of Constantinople which went on to blockade Sevastopol. The lesser known British actions were the deployment of both a Baltic fleet and a smaller pacific fleet to assault the Russian Baltic ports and Russian Pacific territories.[95] The allied fleet in the Black Sea was a combined British and French naval group and together they were involved in various naval actions, the most notable other than the blockade of Sevastopol being the bombardment of the Russian coastal city of Odessa.[96] The bombardment of Odessa was the first direct military action taken by the British and French during this conflict. A land force was also dispatched to Varna, in an attempt to assist the Turkish forces in the Danubian principalities. This land force was poorly organized and suffered greatly as a result of both privation of necessities and a dearth of leadership. In addition to these weaknesses, the British Military Medical Department of the time was almost a non-department, being largely staffed with civilian officers and lacking in both finance and practical experience. This is best illustrated through this quote from the Director General of the British Military Medical Department, Andrew Smith, taken from the preface of the '*Medical and Surgical History of the British army which served in Turkey and the Crimea during the war against Russia in the years 1854-55-56'*.

[95] Trevor Royle, *Crimea: The Great Crimean War 1854 – 1856*, pp.155-165; Orlando Figes, *Crimea: The Last Crusade*, pp.8-9; Sir Edward Hamley, *The War in the Crimea*, (London, Seeley and Co. Limited, 1910), pp.18-24.
[96] James Grant, *The Crimean War*, Edited by Bob Carruthers, (South Yorkshire, Pen and Sword Books Ltd, 2013), p.5.

> When it was determined, in 1854, that a Military Force should leave the country and proceed up the Mediterranean, to aid the Turks… I was required to immediately provide an adequate Medical Staff, and the amount of stores likely to be wanted for hospital purposes. If I had been given to understand when I received this intimation that the troops were to be employed on the duties which are usually exacted of soldiers in times of peace, I should have had no difficulty in deciding what I ought to furnish, but the having been on the contrary led to expect that they would probably soon be engaged in the field, in conflict with the enemy, caused me much consternation and anxiety, the more especially as neither myself nor any of the officers of the Department had, from any personal experience, a knowledge of all that would probably be found necessary for the wants of sick and wounded during a European war.[97]

Mr Smith goes on to note that faced with this dilemma, he attempted to discover what would be necessary through research into departmental records. Unfortunately, the result of this research led to nothing of value being uncovered, and so the overall supply was left to educated guess work. Which, Mr Smith notes, he believes would have been sufficient were it not for the consistent epidemics of cholera which affected the British force for almost its entire period of deployment. Indeed, this lack of appropriate information and medical record keeping Mr Smith declares to have been the reason he felt it necessary to compile as much information relating to the conflict as possible, to prevent his eventual successor from being hampered by insufficient knowledge.[98]

[97] *Medical and Surgical History, Crimea 1854-55-56, Vol. I* p.iii-iv.
[98] *Medical and Surgical History, Crimea 1854-55-56, Vol. I* p.iii-iv.

The British and French deployment in Varna was to prove unnecessary, as before their combined armies reached a state of readiness, conflict in the region ended with a Russian withdrawal. This withdrawal was due primarily to an Austrian ultimatum, demanding that Russian forces leave the region under threat of intervention by Austrian force on the Transylvanian border.[99] During this time in Bulgaria however, the forces of the British and French suffered severely from disease and mismanagement. After the Russian withdrawal, Lord Cardigan took 200 cavalry through near desert conditions and ruined their horses, and shortly afterwards a French force of irregular Turkish cavalry travelled through the same area and as well as suffering from the heat and lack of water, were struck by an epidemic of cholera which felled a great number of them. This disaster led to the French controlled Turkish irregular cavalry being disbanded.[100] These forces remained in Varna for a period of months where they, along with the fleets were struck by cholera.[101] William H. Russel notes that the casualties among these forces from cholera were of around 700 among the British and in excess of 4000 among the French.[102] The *Medical and Surgical History of the British Army which served in Turkey and the Crimea*, lists the casualties among the British forces within this period as somewhat higher. Within the army in the month of August, the mortality rate from disease is given at 2.82%, a figure which came to 852 men. The highest rate of mortality being among the cavalry at 5.15%, followed by the Ordinance at 4.36% and the infantry, which had the greatest number of deaths numerically, at 2.48%.[103] The British forces were not alone in suffering from disease in this period however, Russel also noted that of

[99] Trevor Royle, *Crimea: The Great Crimean War 1854 – 1856,* p.170.
[100] Trevor Royle, *Crimea: The Great Crimean War 1854 – 1856,* p.172.
[101] *William Howard Russel, Complete History of the Russian War*p.40.
[102] *William Howard Russel, Complete History of the Russian War* p.40.
[103] *Medical and Surgical History, Crimea 1854-55-56,* p.44.

the Russian casualties, which he claims numbered as many as 35,000 by January of 1853: "Fatigue, hunger, want, cold, the marsh fever, and the cholera, had swept away five sixths of these wretched victims to military ambition. "[104]

Criticism for the British military organisation was wide spread. William H. Russel, correspondent of *The Times* famous for his critique of the treatment of soldiers during the Crimean War, notes that:

> From the departure of our first battalions till the close of the war, there were occasions on which the shortcomings of great departments and the inefficiency of extemporary arrangements were exposed beyond denial or explanation…. With all their hopes, the people at the outset were little prepared for the costs and disasters of war.[105]

Indeed, Russel goes further to explain this insufficient preparation when he quotes what he considered the general feeling of the time, that the forces embarking for the Black Sea "will never go farther than Malta!".[106] Russel here referred to a belief that simply the dispatch of a British force ought to be sufficient to prompt the withdrawal of Russian forces. Of these voices critical of British preparation that of *Punch* warrants mention. Two particular cartoons highlight the lack of organisation prevalent in the British army during this conflict. The first, titled 'The Queen visiting the Imbeciles of the Crimea', depicts an inspection by the queen of three figures,

[104] *William Howard Russel, Complete History of the Russian War* p.29.
[105] *Sir William Howard Russel, The British Expedition to the Crimea,* p.3.
[106] *Sir William Howard Russel, The British Expedition to the Crimea,* p.3.

one the medical department, portrayed as a scarecrow made of medical supplies, the second Routine, a uniform with the head of a pig, and the third the commissariat, bearing the head of a turnip and containing empty shelves.[107]

THE QUEEN VISITING THE IMBECILES OF THE CRIMEA.

Figure 2 Punch, The Queen visiting the imbeciles of the Crimea, 14/04/1855

[107] Punch, 14/04/1855, The Queen visiting the imbeciles of the Crimea, Reproduced with Permission of Punch Ltd., www.punch.co.uk.

The second of these cartoons displaying two soldiers in squalid conditions and torn uniforms with the caption: “Well Jack, here’s good news from home. We’re to have a medal.” “That’s

“ Well, Jack! Here’s good news from Home. We’re to have a Medal.”
“ That’s very kind. Maybe one of these days we’ll have a Coat to stick it on?”

Figure 3 Punch, 10/02/1855

very kind. Maybe one of these days we’ll have a coat to stick it on.”[108]

From Varna the Anglo-French army made its way to the Crimea, eventually landing at Calamita bay. This landing itself being notable for the number who were already sick and dying from their abortive deployment in Bulgaria. From here the campaign was to begin in earnest, and from here the majority of deaths from disease occurred, only slowing after the enacting of sanitary and administrative reforms. From its earliest deployments in this conflict, the British army proved

[108] Punch, 10/02/1855, Reproduced with Permission of Punch Ltd., www.punch.co.uk.

poorly prepared and poorly organized. The manner of its organisation being necessitated in part by the uncertain nature of its deployment, as its goals seemed to change regularly. But most of the blame for the disorganized nature of the force can be, and indeed has been, generally attributed to the Command, the commissariat, and the medical department.

The 1857 Sepoy revolt

The 1863 reforms in India arose in an entirely different manner to the reforms of the Crimea. Unlike the Crimean reforms, which arose in time of war as a response to a conflict which was already occurring, the 1863 reform proposal was more of a thought out and delayed response to a conflict. The reforms themselves are best examined through the lens of the 1863 *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*. This report reveals a genuine fear that there would be significant difficulty in maintaining the health of the British occupying forces in India. This was expressed in terms of the difficulty associated with the financial cost of replacing invalided and deceased soldiers as well as the logistical difficulty of maintaining the necessary number of healthy soldiers to effectively govern India. [109] However, as these difficulties were by no means a new concern, it must be asked why this issue warranted an official commission set up by Queen Victoria at this particular point in time. The reason this action now became necessary can be traced to events beginning just two years before the report was commissioned in 1859. The revolt of 1857 by the native troops of the East India Company in Northern India shook the British faith in the safety of their Indian possessions. Where previously these native soldiers had been trusted to maintain rule in India, the revolt led to a fear that no

[109] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.9-11 and pp.32-35.

native troops could be trusted absolutely. This fear persisted despite the loyalty that had been shown by the large number of Sikhs and Ghurkhas who fought alongside the British during the Sepoy Rebellion. As the majority of the soldiers able to be called upon for the defence of British India were native troops,[110] the health and physical readiness of the European soldiers in India became a prime concern for the British government.

According to the commissioner's report, the European strength in India consisted of 84,083[111] officers and men of all departments during the year of 1861 out of a total military strength of 227,005 officers and men in the entire British army. The number of native troops serving in India at this time is given as 137,804 in this commissioner's report. This is a sharp decrease from the number of native troops serving in 1856 before the revolt, and indeed a sharp increase in the number of European troops serving in India. The numbers given by the commissioner's report for the period of 1856 are 44,391 European officers and men compared to a native troop count of 235,221 native troops.[112] This scaling down of native troops and scaling up of European troops is clear evidence of a reorganisation of British military power within India. However, this growth in the number of European troops resulted in a significant increase in the costs associated with maintaining their health, while also replacing those killed or invalided as a result of the seemingly inevitable epidemic diseases which so often affected Europeans serving in India. This increase in the numbers of European troops, subject to the same medical concerns as the smaller number previously stationed in India, created an urgent need for an immediate solution to the

[110] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.11.
[111] This number includes European officers and non-commissioned officers serving in native regiments, without these additions the number of British officers and men in India is claimed by this report to be 82,156.
[112] Table 2. – Military Force employed in India in 1856 and 1861, *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.173 and p.10.

problems caused by epidemic disease and poor sanitation. The cost of maintaining a European soldier in India was estimated by the commissioner's report at 100£ per man per year.[113] The cost of a British soldier was compared to that of an Indian soldier at a ratio of around 3 to 1, or more specifically 289 to 100.[114] This increase in the numbers of European troops represented a significant cost.

In addition to the inevitable losses from disease and illness associated with military service in India, the unanticipated fatalities, injuries and deaths from infection and contagion arising as a result of the Sepoy Rebellion provided further cause for concern and contributed to the calls for reform. The number of casualties due to disease during the various sieges of the Sepoy Rebellion, notably Cawnpore (Kanpur) and Lucknow could likely have been enough to provoke sanitary reform in and of themselves were it not for other factors drawing attention away from these deaths. The problems faced during the revolt are not that different from those faced during the Crimean War in terms of the ravages of disease, but the special nature of the conflict prevented this from being viewed in the same way. Unlike the Crimean campaign, the atrocities committed by all sides during the revolt were sufficient to prevent the issues of sanitation from being a focal point for public opinion. Additionally, the question of supply and preparation are fundamentally different for an active aggressive campaign such as the Sevastopol campaign of the Crimean War, and the various holding defensive actions followed by harsh reprisals which characterised the Sepoy Rebellion.

[113] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.33-34.
[114] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.32-33.

The Sepoy Rebellion of 1857 and its causes provide context within which the need for reform came to be understood by the British administration. The primary causes of this rebellion are hotly debated, as the topic is a controversial one. So much so that how the war itself is named can be a cause of disagreement, the two predominant names in use being the Indian Mutiny and The First Indian War of Independence. However, as both of these names carry an emotive position I have opted for the less fraught title of The 1857 Sepoy Revolt, in the hopes that the majority of this conflict can be avoided. Several of the major causes of this conflict come under the broader heading of out of touch bureaucratic mismanagement on the part of the colonial powers. The doctrine of lapse,[115] the admission of missionaries both to the troops lines and to the native villages,[116] the question of the new cartridges,[117] and the highhanded treatment of the sepoys by European soldiers[118] were all among the causes for revolt. The imposition of the Doctrine of Lapse and the subsequent annexation of Oudhe[119] and removal of several rulers who did not fit British criteria created many enemies for British administration[120] and arguably resentment among the Indian population.[121] Indeed, many of the leaders chosen by the mutineers were these deposed figures, notably Nana Sahib and the Rani of Jhansi Lakshmi Bai among others who had been victims of the doctrine of lapse.

[115] Bhupen Qanungo, "A Study of British Relations with the Native States of India, 1858-62" *The journal of Asian Studies*, Vol.26, No.2 (1967): 251-265, p.253 and p.260.
[116] Faisal Devji, "The Mutiny to Come", *New Literary History*, Vol 40, No.2, (2009): p.416; Ian Copland, "Christianity as an Arm of Empire", *The Historical Journal*, Vol.49, No.4, (2006): pp.1047-1048.
[117] Irfan Habib, "The Coming of 1857" *Social Scientist*, Vol.26 No1/4 (1998): 6-15, p.8.
[118] Douglas M. Peers, "'The Habitual Nobility of Being': British Officers and the Social Construction of the Bengal Army in the Early Nineteenth Century", *Modern Asian Studies*, Vol. 25, No. 3 (1991): pp.559-560; D.A. Wadhbrook, "Ethnicity and Racialism in Colonial Indian Society", *Racism and Colonialism*, Essays on Ideology and Social structure, (1982): p.157.
[119] Irfan Habib, "The Coming of 1857", p.7.
[120] Rudrangshu Mukherjee, "Awadh in revolt" in *The 1857 Rebellion: Debates in Indian History and Society*, (New Delhi: Oxford University Press, 2007), p.224.
[121] Rudrangshu Mukherjee, "Awadh in revolt", p.241.

The conflict was one of the colonised against the coloniser, not simply a military insurrection, but a widespread expression of social grievance against an out of touch bureaucracy, utilising the military structures of the coloniser against them.[122] This conflict and the terrible violence and atrocities which characterised it distracted from the great number of deaths which were due to poor sanitary conditions. Indeed, many more deaths could be traced to disease than to the wounds and death in battle. The *Report of the Commissioners Appointed to Inquire into the Sanitary State of the Army in India* noting that:

> For out of 9,467 men dying among the regiments of India prior to the mutiny, or sent out in 1857-8, only 586 were killed in action or died of wounds. All the evidence goes to show that the mortality in the wars of India is chiefly from diseases before referred to. [123]

Yet the ideological nature of the revolt, and its implications meant that sanitary concerns became an issue to be resolved after the culmination of the conflict, barely even registering during it.

In establishing the presence of poor standards of sanitary preparation, and the inevitable consequence of these, an examination of some of the letters and accounts that emerged from the besieged cantonments of Lucknow and Kanpur is invaluable. Multiple accounts of death from epidemic disease arise as an unfortunate addition to those caused by violence. One of the few survivors of the siege of Kanpur, Mowbray Thompson, wrote in his account of the siege and

[122] J. p. C. Laband, "The Nature of the Indian Mutiny: A Changing Concept", *Theoria: A Journal of Social and Political Theory*, No. 46 (1976): p.30.
[123] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India,* p.31.

eventual relief of Kanpur of several incidents of death by cholera and 'fever'. Indeed, he even goes on to mention that Cholera was so much worse on its 'Native soil' of India, when recounting the sad fate of Ensign Brown of the 56th Native infantry:

> Brown shared in all the battles of the first advance to Lucknow. He came back to Cawnpore[Kanpur] and died of Cholera. He called to see me in my tent one afternoon in perfect health – the next morning he was dead. Several officers and many privates were cut off in this manner. The funerals were all conducted in perfect silence; neither volleys were fired nor bands played, lest the frequency of the sepulchral rites should cause a panic amongst the men. From the inadequate forces at Cawnpore, when General Havelock was anxiously waiting to relieve Lucknow, we lost three hundred in one week due to this horrible disease, which always riots with uncontrolled fury on its own indigenous soil, the banks of the Ganges.[124]

The effects of epidemic disease during this campaign were severe, although largely glossed over in the overall historiography. The primary focus to date appears to have been attempts to apportion blame, discussions of Indian nationalism, and the greater part of the consideration goes to atrocities. This lack of focus can be easily understood. It is difficult to lament the death of those who fell to cholera after the recapture of Kanpur in the face of the atrocities which the recapture of Kanpur heralded. These included the discovery that the European women and children who had survived the massacre at the Ganges were found butchered, stripped naked and

[124] Mowbray Thompson, *The Cawnpore Man*, p.126.

thrown into a well.[125] This was followed by the subsequent hanging of countless Indian inhabitants from the region by the enraged army attempting to punish those they believed responsible for the murder of their wives and families. This was followed by the massacre of the rebel force besieging the Lucknow residency, an event described in horrific detail in the memoirs of James Fairweather, a surgeon of the 4th Punjab Native Infantry. This event described with the same sense of righteous fury as the murders at Kanpur.[126] Such atrocities far overshadow what then appears a meagre loss to disease. But this loss was not simply a few outbreaks, it is a consistent theme, mentioned in passing by many primary sources, often in an offhand manner, and as already noted, accounting for more deaths than combat. The references are often presented as if the death by cholera or 'fever' was less of a concern due to its occurrence during trying times.

The anonymous author of "A Lady's Diary of the Siege of Lucknow" mentions death due to illness as quite a tragedy when it occurs among women and children, but she refers to the death of soldiers by cholera in the same matter of fact manner in which she notes their death by gunfire. The death of Captain Mansfield received only "Captain Mansfield of the 32nd was seized with cholera during the night and died this morning."[127] The statement almost a side note in the diary entry which began with an infant death in the night and went on to discuss several other points in greater detail. Fairweather mentions a cholera outbreak among those in his care during the march to Agra, but has no recollection of the number afflicted or killed, the tale appearing to be more of an anecdote about his friend Captain Wilde, who survived against his expectations

[125] William Wright, *Through the Indian Mutiny: James Fairweather, 1857-1858*, pp.129 -130.
[126] William Wright, *Through the Indian Mutiny: James Fairweather, 1857-1858*, pp.148-150.
[127] *A Lady's Diary of the Siege of Lucknow: Written for the perusal of friends at home*, (London, John Murray, 1858), p.111.

and was returned to Delhi while Fairweather carried on.[128] The number of outbreaks of disease could have, in calmer times, led to sanitary reform on their own, particularly in the context of the Crimean reforms. The nature of the Sepoy Rebellion itself is what prevented immediate reform, or even the knowledge that such reform was necessary.

The Sepoy Rebellion in turn, led to questioning of the sustainability of British control over India, and attempts were made to guarantee that this control could be maintained. The sanitary commission which was assigned to inquire into the sanitary state of the army in India in 1859, attempted to preserve the suddenly fragile status and power of the British Raj. Unlike the reforms which took place among the British army in the Crimea, these reforms took place in a time of relative peace immediately post conflict. The fact that these reforms took place in a colonial setting means that they also encompassed some degree of public health, not simply reforms for the maintenance of the British army. The public health element can be seen in the attempts to ensure that Epidemic disease would not simply be communicated to the soldiers of the British army by those without any benefit of reform. Post rebellion reform was not limited solely to matters of sanitation however. Sanitary reform was becoming a major part of this movement to better govern India directly influenced by the Sepoy Rebellion.

[128] William Wright, *Through the Indian Mutiny: James Fairweather. 1857-1858*, pp.123-124.

Chapter 3, Crimean War Reforms

"Is not this the most complete experiment in army hygiene?" Florence Nightingale[129]

Introduction

Within this chapter, the events which necessitated reform, the actions taken to decrease mortality and the efficacy of those actions is examined. The condition of the British army after its deployments in Bulgaria and the Crimea, the widespread criticism of the Army and Medical Departments administration, and the British Press informing the British public of the state of the army were the primary spurs to reform. By analysing the conditions which were faced by the British Army during its deployment to Varna and the Crimea, the medical issues which were faced are highlighted, as are the sanitary responses to these conditions. Through thorough examination of first-hand accounts and official records, the actions taken to prevent loss of life through disease are examined. Through analysis of the actions taken, and the efficacy of these actions, the influence of sanitary knowledge and practice can be seen. This also allows an examination of the role of Nightingale and the British Military Medical Department within these reforms, and the importance of the statistical data which they compiled and analysed. Through this approach, the efficacy of sanitary theory and the growth of its authority in the face of some opposition is uncovered and the importance of the practice of data collection is revealed.

Medical Timeline

[129] *Florence Nightingale, Health, Efficiency, and Hospital Administration of the British Army*, p.493.

Of the various diseases which afflicted the British Army in the Crimea, cholera was the disease most noted for the shocking nature if its onset and the speed with which it killed. As was mentioned earlier, Andrew Smith, Director General of the British Military Medical Department, predominantly blamed the insufficient medical organisation during the campaign on the epidemics of cholera.[130] A timeline of the onset of diseases and their effects grants context for later discussion of diseases and an understanding of which months of the conflict had the greatest number of deaths.

The British army initially landed at Varna in Bulgaria and while there, cholera broke out within the British and French armies. The first recorded cases of cholera within the British army were identified on the 17th of June 1854.[131] According to the French Doctor Jean-Baptiste Louis Baudens, the first signs of cholera appeared within the French army on the 9th of July. This he claims was "doubtless imported into the East by the successive contingents of the fifth division, embarked in the South of France, where the population was prey to this epidemic".[132] This theory of the origin of this first cholera epidemic is generally accepted, although a lot of earlier British sources wrote that cholera was simply endemic to the region, Orlando Figes noting the outbreak of cholera which was spread across the entirety of south-east Europe.[133] However, there are other sources which claim that cholera broke out first among the French, which would remove the apparent inconsistency of the cholera being brought in by the French but with the British being the first to suffer.[134] It may be assumed that either the records of Dr Baudens or the

[130] *Medical and Surgical History, Crimea, 1854-55-56 Vol.I,* p.iii-iv.
[131] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* p.45.
[132] *L. Baudens, On Military and Camp Hospitals, of the French Army,* p.123.
[133] Orlando Figes, *Crimea: The Last Crusade,* p.191; Sir Edward Hamley, *The War in the Crimea*, (London, Seeley and Co. Limited, 1910), p.29.
[134] Trevor Royle, *Crimea: The Great Crimean War 1854 – 1856,* (New York, St Martin's Press, 2000). p.176.

returns of the British Military Medical Department are in error. There could potentially have been multiple sources for the cholera outbreak, as the account of the 5th Dragoon Guards notes that a village near one of the British cavalry camps was suffering from cholera.[135] This first epidemic of cholera continued from Varna through to the British deployment in the Crimea, dying out in February of 1855 and lasting a period of around eight or nine months from its first confirmed signs until its end. Within its first month there was only a single British death from cholera, and within the last only twelve. However, within this period, deaths rose as high as 651 from cholera alone in December, hospital admissions rising as high as 1232 in the month of September. No further deaths from cholera were recorded again until May of 1855, which saw the prelude to the second Epidemic.[136]

The second epidemic officially began in April of 1855 with seven cases of cholera reported. By May however, there were as many as 426 cases, and 261 deaths from cholera alone.[137] This epidemic reached its peak in June of 1855, with 625 deaths from cholera, and 1128 hospital admissions from the disease. By December of 1855 this epidemic had begun to die out. Cholera did persist in very small numbers for the remainder of the army's time within the Crimea, but from January 1856 onwards, no more than four deaths occurred in any one month, and in some months, none at all.[138] The mortality rate during the second cholera epidemic overall is lower than that of the first, which may indicate that improved conditions of hygiene may have played a role by the end of the epidemic, although it is not clear whether this epidemic was less severe

[135] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.12.
[136] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* pp.86-87.
[137] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.72.
[138] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.87.

overall due to improved general health of the British army or due to improved hygienic measures.

Alongside these two epidemics of cholera the general losses from disease exhibit two primary spikes in mortality. The first spike in mortality, occurred from December in 1854 to march of 1855 and reached its peak in January. The second spike in mortality occurred in June of 1855, although to a much lesser extent than the first, with a peak of 830 deaths from disease, a number lower than in any of the four months of the first spike in mortality.[139] Unlike with the epidemics of cholera, which show a slight decline between the first and second epidemics, the decrease in mortality between the first overall mortality spike and the second reveal a much greater decrease in mortality. The overall number of deaths from disease in the British army in 1855 is given at 3,076, the second spike of 830 deaths from disease in June of 1855 reveals the overall improvement in the health of the army, with the mortality figures from disease never rising above the figures of the second mortality spike in the remaining year of the British presence in the Crimea.[140] The first of these mortality spikes coincided with the onset of the first winter in the Crimea, and the second spike with the greatest point of the second cholera epidemic.[141] The second winter faced by the British army in the Crimea caused much less hardship than the first, and did not coincide with any spike in mortality from disease in the British army, although among the French army the second winter caused a great increase in death rates.[142] These figures reveal the improvement in the state of the British army from one winter to the next. This

[139] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* pp.43- 44.
[140] *Medical and Surgical History, Crimea 1854-55-56, Vol. II* p.44.
[141] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.87.
[142]Jean Charles Chenu, On the Conservation of Armies on Campaign, p.131.

improvement in the general health of the army suggests that reform by this point was yielding visible results.

The British Military Medical Department

The state of the British Military Medical Department, although touched upon in the background, deserves further attention, as it was the issues and weaknesses of this department which made sanitary reform necessary, and indeed, in some cases hindered attempts at reform. The weaknesses of the British Military Medical Department during this period are well known, written about by Florence Nightingale, William Russel and indeed, even the British Military Medical Department itself. Nightingale's criticisms appear to be the most detailed and specific however, and as such grant a clearer view of the failings which needed to be addressed. In Nightingale's '*Notes on Matters affecting the Health, Efficiency, and Hospital Administration of the British Army'*[143] she draws most of her evidence from the events of the Crimean War. One of the weaknesses of the British Military Medical Department which Nightingale highlights is its lack of credibility and authority, particularly among those in command. Before the British army reached Varna, they sent three medical officers to examine the proposed area of operation so that they could make recommendations regarding what would be needed to maintain the health of the army. Nightingale argues that this entire process proved useless as the recommendations were not passed on to Lord Raglan, the commander of the British forces, by Dr Smith, the Director General of the British Military Medical Department: *"*And Dr Smith Issues no instructions on the Sanitary part, so that the Commission was a dead failure, in as far as any practical good is

[143] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*.

supposed to be the result of a Commission.*"*[144] The only information Nightingale claims was passed on to the Horse Guards, was the recommendations for uniforms better suited to the weather of Turkey and the Danube. Unfortunately for all involved, these uniform recommendations were ignored. As a result, the commission may as well not have been sent, as all of its recommendations were either ignored or refused. Nightingale writes scathingly of this practice: "Thus, the commission sent by the head of the Department in charge of the Army's health, and authorized by the Horse Guards in charge of the Army's efficiency, falls to the ground without effect."[145] Indeed, Nightingale declares that this system could achieve nothing less than a great deal of wasted life, and that the actions of the army's administration in this matter were a key cause of the suffering of the army: "It would indeed be difficult to frame a system of administration more likely to lose an Army at any time than this. Here is the first downward step of our noble Army to destruction."[146] Temple Godman of the 5th Dragoon Guards also complained of the British Military Medical Department during his deployment, noting in a letter to his father after the battle of Alma: "I believe you think in England that every preparation has been taken to make the sick and wounded as comfortable as possible; such is not the case, indeed anything so disgraceful as the whole department it is impossible to imagine."[147] The organisation of the British Military Medical Department, and how it fits into the hierarchy of the British army was clearly in need of reform.

[144] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.iv.
[145] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.iv.
[146] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.iv.
[147] Temple Godman to 'My dear Father', October 19th 1854, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign*, p.72.

Nightingale also kept a record of the various requests made by the army for appropriate supplies, everything from Tarpaulin for hospital marquee floors to warm clothing in general and water filters.[148] The criticism of the army's commissariat is closely linked to that of the medical department. As in many cases, the items which were lacking were specifically related to the medical department's role in either treating or preventing disease. Indeed, without adequate supply, proper sanitary procedures become impossible and the conditions within which disease proliferates become inevitable. As already identified by Nightingale and Dr Smith, the general administration of the army was as much at fault as the medical department and the commissariat. A great number of the surviving accounts of those soldiers who served within the British Army in the Crimea note the privation and want of supplies they suffered during the campaign. George Dallas, an officer of the 46th infantry regiment notes in his letters the paucity of supply upon reaching the Crimea, noting that from the 16th to the 18th of September, his regiment possessed only a single blanket each. He made specific note of a want of food and firewood as well: "The nights we find very cold and the food is running short, so the sooner we move the better. Firewood is not to be got and water miles off. The men suffer a good deal, I fancy."[149] Temple Godman of the 5th Dragoon Guards wrote in November of 1854 from the camp before Sevastopol of the poor state of the soldiers, who were permanently wet as they had no change of clothes and must sleep in their uniforms due to the cold. This condition he considered to be a cause of much of the sickness which afflicted his men.[150] During this month the *Medical and Surgical History of the British Army which served in Turkey and the Crimea* notes that there

[148] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.v-vii.
[149] Frederick Dallas, "Letter 6" from Michael Hargreave Mawson, *Eyewitness in the Crimea: The Crimean war letters of Lieutenant Colonel George Frederick Dallas*, (London, Greenhill books, 2001), p.32.
[150] Temple Godman to 'My dear Joseph' November 12th 1854, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign*, p.87.

were 133 hospital admissions amongst Godman's regiment, of whom six died. In addition to this the report notes that *"*the men were overworked, improperly fed, and deficient in the most essential articles of clothing."[151] Indeed, the breakdown of sickness within this month by the report notes a '*very great increase of sickness'*, with 32 admissions being attributed to 'fever' 70 to dysentery and diarrhoea and 12 to scurvy.[152] William Russel tells a tale of a remarkable blunder on the part of the commissariat and the military command itself. 60 field guns, transported to Constantinople aboard the Taurus, were, at the commanding Admiral's order, removed from the Taurus and loaded into another ship, the Gertrude, atop the medical supplies which she was carrying. As a result, when the ship reached Varna, it was unable to unload the medical supplies as it had nowhere to first unload the guns packed atop of them.[153] The supply and organisation of the British Army in general was in need of better organisation and administration, as they were unable to meet many of the basic logistical needs of an army at war. This lack of food, shelter and medical supplies contributed to the epidemic conditions which necessitated sanitary reforms.

The Times also joined in with the criticisms of the army and the medical department. These criticisms took the form of both letters to the editor and reports from correspondents. A great number of letters were received from concerned families over the condition of their loved ones. A pair of quite striking letters published by *The Times* on the second of January in 1855 contain a reprimand of the government agents who were tasked with bringing warm clothing to the army

[151] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.15.
[152] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.15.
[153] *Sir William Howard Russel, The British Expedition to the Crimea,* pp.236-237.

in the Crimea from a mother and a brother of soldiers serving there.[154] On the same day *The Times* also published a letter from its regular correspondent in Turkey containing a strong rebuke of the work it claimed was expected of the British army at Sevastopol. The correspondent claiming that for the task that was expected of the British force, the number of soldiers assigned was woefully insufficient. Indeed, even going so far as to declare that the key cause of poor state of the British army compared to the French was likely the amount of work expected of them, rather than a relative paucity of supplies.[155] In this same article, the poor situation of the British soldiers is also mentioned along with the poor state of supply:

> All the commissariat mules were dead or disabled, the carts had broken down, and the man at the front had nothing to eat. For many days they were on half rations, and many, I believe, did not get so much. A mouthful or two of pork and a little biscuit was the supply of men who had to labour night and day, and who were exposed to all the inclemency's of a damp and rainy season.[156]

The Times remained a key voice of criticism throughout the conflict, and their famous correspondent William Russel went on to write several books relating his recollections of the conflict. After the battle of Alma, Russel makes a note of the differing conditions faced by the English wounded compared to those of the more organized French force, making particular note of the French hospital vans.[157] The greater preparation and organisation of the French force was

[154] "A Mother and his Brother, Warm clothing for the Army in the Crimea." *The Times,* January 2, 1855 p.10.
[155] "Turkey." *The Times,* January 2, 1855, p.7.
[156] "Turkey." *The Times,* January 2, 1855, p.7.
[157] Sir William Howard Russel, *The British Expedition to the Crimea,* pp.127-128.

to reveal itself in all of its advantages in the first winter of the campaign. The presentation of the suffering of the British army in Turkey and the Crimea to the British public by *The Times* was to result in a call for vast improvements in both supply and organisation. *The Times* did not simply write about these issues, they took action to attempt to aid the soldiers of the British army in the Crimea. A *Times* fund was established to purchase supplies that the commissariat had not provided, or which it had provided, but had not been able to reach either the soldiers or had been turned to another purpose. Russel gives an example of this misuse of supplies, noting an instance in which the prefabricated huts which were dispatched for the shelter of the soldiers which, he believed, often ended up either as firewood or officer's stables.[158] The Reverend Sydney Osborne, working alongside the Almoner of this *Times* fund, stated that when asked what he would be procuring for the army with the fund, replied that he procured whatever Ms Nightingale asked for.[159] *The Times* itself in many cases can be seen to have been calling for better treatment of Britain's soldiers, in both its articles and indeed, its direct actions. This fund proved invaluable, as in spite of a lack of many supplies, the senior staff of the British Military Medical Department claimed that they had all that was needed, in spite of the evidence to the contrary. Indeed, the Reverend Sydney Osborne notes that in his discussions with the Superior Medical Officer Dr Menzies at the general hospital at Scutari, whenever he was to offer to financial assistance to purchase any necessities which were lacking, Menzies replied that "they had everything – nothing was wanted."[160] In this manner it was clear that although this fund bypassed official channels, it revealed a startling weakness in the administration of the British

[158] Sir William Howard Russel, *The British Expedition to the Crimea,* pp.127-196.
[159] Sydney Osborne, *Scutari and its Hospitals,* p.2.
[160] Sydney Osborne, *Scutari and its Hospitals,* p.2-4.

Military Medical Department in the Crimea, particularly in how out of touch they were with the privations of their patients and staff.

Crimean Hospitals

The hospitals which were to care for the British sick and wounded from the conflict were another key area which was in desperate need of reform. These were located in several areas of the conflict, but the most notable were those near Constantinople (Istanbul) at Scutari. By all accounts before the intervention of Nightingale and the other volunteer nurses, these hospitals were understaffed, poorly established and in a most unhealthy condition. There were several military hospitals used by the British army, the most famous of which were the hospitals at Scutari and Koulali. The hospitals at Scutari were infamous for the standard at which they were initially kept, and the distance they were from the fields of war. The wounded often ended up making a journey overland to the sea on stretchers, then officially, a four-and-a-half-day journey across the sea to the hospitals. Although, as the reverend Sydney Osborne points out, this figure by no means accounted for the period of often weeks, where the wounded waited aboard ship prior to beginning the voyage, and the similar amount of time before they were able to be unloaded at their destination.[161] The reverend's account here is supported by the figures given in the '*Return of Vessels which arrived at Scutari, &c., with Sick and Wounded*' table of the *Medical and Surgical History*, which gives some examples of a delay in disembarkation of the wounded at Scutari. One example is the returns of the *Trent*, which shows a departure date of the 25th of November 1854 an arrival date of the 27th of November 1854 with the beginnings of disembarkation on the 28th of November 1854, and a completion of disembarkation on the 2nd of December 1854 a total of two days in transit, but near to six days before the wounded were

[161] Sydney Osborne, *Scutari and its Hospitals*, p.31.

unloaded.[162] On these long voyages and during these long waiting periods spent without medical treatment, many patients would succumb to disease, or indeed infect one another,[163] all for a lack of appropriate organisation and administration.

There is some difficulty in achieving accurate returns relating to where reform was effective, and who was responsible for the instigation of reform or improvements in any particular hospital. This is largely because of the broad number of hospitals operating within the Crimea, and a lack of uniformity among them. The *Medical and Surgical History of the British Army which served in Turkey and the Crimea* contains a record of the medical statistics of nine General hospitals, listed as; Camp General Hospital Crimea, General Hospital St Georges Monastery Crimea, Abydos Hospital Dardanelles, Smyrna Hospital, General Hospital Balaclava, Castle Hospital Balaclava, General Hospital Bosphorus, General Hospital and Depot Varna and Renkioi Hospital Dardanelles.[164] The statistical returns regarding these hospitals contain a detailed breakdown of the various classes of diseases, alongside hospital admissions and deaths for these diseases month by month. Unfortunately, little additional information is given regarding particular hospitals in this document, except in several instances, meteorological data.[165] The Reverend Sydney Osborne makes note of two floating hospitals at the Golden Horn, and a naval hospital at Therapia. Osborne does not provide much in the way of statistics, but gives a decent account of the conditions within these hospitals, and those hospitals at Scutari and Koulali.[166] The accounts of these hospitals given at the beginning of this conflict are harrowing, and numerous. The

[162] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* p.465.
[163] Sydney Osborne, *Scutari and its Hospitals*, pp.34-36.
[164] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* p.43-44.
[165] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* p.43-44.
[166] Sydney Osborne, *Scutari and its Hospitals*, pp.49-50.

Barrack Hospital infamously sat over a cesspool, was overcrowded, and in such poor repair that the patients in one wing were exposed to the weather.[167] Of the hospitals of Scutari and Koulali the *Crimean Journals of the Sisters of Mercy,* and *Eastern Hospitals and English Nurses, the narrative of twelve months experience in the hospitals of Koulali and Scutari by a Lady Volunteer,* give very detailed accounts of the day to day workings of these hospitals.[168] Of these accounts there is no uniformity of content, those general hospitals mentioned within the *Medical and Surgical History* give detailed medical statistics, but little information on conditions within the hospitals. The accounts of Nightingale give some detail on some of these hospitals, but generally give an overall account rather than particularly in-depth accounts of individual hospitals. These accounts do reveal several common themes, which in many cases are those same issues highlighted as faced by the army. The hospital accounts uniformly reveal a lack of preparation, inappropriate and variable supply, and generally a lack of appropriate staff and a lack of appropriate training.

Medical Statistics

Florence Nightingale was also critical of the medical department's statistics and record keeping. Indeed, including an entire chapter on the inaccuracy of Hospital Statistics.[169] Within this, Nightingale calls for a separate statistical department to work alongside the medical department, the establishment of a uniform nomenclature of disease and that much greater detail be used regarding hospital admissions. Nightingale draws attention to the particular weaknesses of the official statistical record here, including the number of deaths which may not have been recorded

[167] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.228.
[168] *Eastern Hospitals and English Nurses*; *The Crimean Journals of the Sisters of Mercy.*
[169] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army, Appendix to section XI,* p.i-xi.

or which may have been recorded incorrectly. An example of this being the paucity of records regarding those who died aboard ships on the way to hospitals who were thrown overboard, a figure Nightingale notes as likely around nine hundred and forty nine. Nightingale describes in one circumstance "the Captain of a transport has asserted that seventy bodies were thrown overboard from his ship in one voyage, without their names, regiments, or ranks being entered into any report on board the ship."[170] The regular occurrence of these lost details Nightingale argued could be avoided by a better system of statistical record keeping. Nightingale was also concerned that the information presented to the commanders of the army was not the information which they needed. For example, Nightingale cites a letter to Lord Raglan, from Dr Hall, in which he notes an improvement in the health of the army compared to a previous week by point of percentage. Nightingale states that such an account is of little use to a commander as it grants no insight into the sustainability of the force under its present rate of mortality. Nightingale argued that a useful statistical account ought to include:

1. Present strength,

2. Sick in hospital at a given date,

3. Total admissions since last report,

4. Total deaths since last report,

5. Percentage of sick to present force,

6. Percentage of deaths to present force, per annum,

7. Percentage of admissions from zymotic diseases to total admissions,

8. Percentage of zymotic cases in hospital to total sick,

[170] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.289.

9. Percentage of deaths from zymotic diseases to total deaths from disease,

10. Admissions and deaths from wounds,[171]

In this way Nightingale hoped that the commander of a force would then be able to make actual use of the information given to them by the medical department, and so would be able to take the appropriate course of action to decrease loss of life where applicable or necessary. The collection and utilisation of medical statistics is a major element of the sanitary movement as it is the primary supporting evidence which they give for the efficacy of their theories. This can be seen in chapter two through the analysis of the work of the public health movement in Britain, and particularly the reports of Edwin Chadwick. Nightingale's recommendations relating to the collection of useful statistical data are part of a trend of improving the collection of medical data which will be examined further in chapters four and five as similar recommendations were made in the 1863 *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India.*

The reforms themselves

Unlike those reforms which took place in India, the Crimean reforms were not so carefully planned, the large bodies of primary source material surrounding them generally being written after the culmination of the war. This differs starkly from the proposed Indian reforms, which had the benefit of research and examination and recommendation before any actual reform was enacted. As a result, the Crimean reforms are not as simple to examine and cannot be looked at

[171] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* pp.293-296.

in the format of proposed reform, actions taken and the efficacy of those actions. Instead, these reforms must be examined by looking at the dialogues surrounding them, particularly the accounts of those who lived through them, both working in the hospitals and serving in the general army. The changes they witnessed following the reforms heralded by the arrival of Florence Nightingale, reveal to some extent the actions taken, or at the least, the results of these actions. In addition to this, an examination of the recorded statistics reveals the efficacy of these reforms. In this manner the mechanisms through which sanitary knowledge gained authority throughout the course of this conflict become apparent. The advantages of using statistical evidence to justify theory are made clear through examination of the detailed medical records kept, and the nature of those reformers is also revealed.

One area where there is a clear change in reported concerns is in the accounts of the nurses, be they vocational, members of a religious nursing order or Lady volunteers, who occupied the hospitals during the war. These accounts include those of Florence Nightingale, who organized and supervised these nurses throughout the conflict. The arrival of nurses was in itself a part of the reform process, as prior to their arrival most of the work they undertook was done by male orderlies, often soldiers unfit for combat, who proved wholly inappropriate for the role. The utilisation of female nurses was in itself an element of reform. However, in spite of this, the accounts of these nurses when they first arrived reveals the state which they found the military hospitals in, and the change that came over these facilities as their organisation was improved and overtaken by Florence Nightingale.

It is worth beginning with Nightingale's accounts, as her recollections and the data she collected during the conflict became the basis for her later recommendations for reform in sanitation in India. Additionally, Nightingale's accounts reveal the weaknesses in the established system of supply for the military hospitals of the Crimea. Through her role as superintendent of nursing, Nightingale was able to initiate change at a hygienic level and a supply level throughout the hospitals of the Crimea. Nightingale's accounts tend to focus more on the broad view of issues than on the minutiae of specific events, however, she does provide great detail regarding supplies, medical statistics and the organisation of the army and its support. Additionally, Nightingale draws a lot of her evidence from outside sources, rather than attempting to solely relate her own experience. As a result of her peculiar writing style it is often difficult to know when Nightingale is referring to her own experiences. That said, the evidence Nightingale provides is very thorough, and the information which she does relate from her own experiences grants a detailed insight into her views on the soldiery of Britain and its needs. Nightingale discusses the state of hygiene within the British hospitals of the Crimea, and notes the poor state of soldiers as they were admitted to the hospital. Nightingale describes the immense relief felt by those soldiers when they were washed and able to wash themselves in hospital as evidence that the common British soldier can easily be convinced to maintain their own hygiene, as they are so distraught when they lack the means to do so.[172] Nightingale also kept an intricate record of items supplied by the purveyor's department, the commissariat and those she organized and supplied for the hospital at Scutari. These lists reveal the improvements she initiated in supply, in addition to supplying these items, her record of them allowed her to examine what was deficient within the regular means of supply, and what was needed overall. The records Nightingale kept

[172] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.186.

include, lists of food supplied privately, including necessities such as arrowroot, lemons, milk and eggs. Nightingale also records that the vast majority of clothing was supplied by private sources, for example between the 10th of November 1854, and February the 15th 1855, Nightingale lists the number of shirts supplied to the hospitals at Scutari at 10,537 cotton shirts and 6,823 Flannel shirts. Of these, 400 of each were supplied by the public stores, the remaining were obtained from private sources.[173] These private sources tended to be charitable donations like the *Times* fund, and others like the Reverend Sydney Osborne who were drawing on donations or personal funds in a humanitarian effort to better supply the sick and wounded. The same is true of most every necessity, indeed, many items were only supplied by private sources, including baths, pillows, operating tables, scissors and countless other useful or essential items. The administration of Nightingale made great use of the charitable donations of various individuals and organisations to procure what was needed for the health and comfort of the sick and wounded.[174] It is clear that such charity was necessary to meet the requirements of active hospitals and that the official channels were simply not competent enough to procure or ensure the arrival of these supplies.

In addition to the general hospitals which received Nightingale's superintendence and nurses, there were also regimental hospitals, which were largely organized by the army, and were often lacking in supply and comforts. A medical officer and a hospital sergeant were assigned responsibility for each regimental hospital. Their duties included the overall superintendence of wards, attendance on patients, administration of medicines, assisting the surgeon with regard to records and accounts, provision of basic cares including controlling diet and washing and also

[173] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.205.
[174] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* pp.204-205.

maintenance of hospital stores, all while maintaining military discipline. Such a list of tasks on such an insufficient staff Nightingale criticized as an impossible workload to be carried out effectively.[175] Nightingale's records of hospital standards and capabilities provide stark contrast with those of the military hospitals prior to Nightingale's arrival. The washing of patients, laundry capabilities and preparation of food and general care for patients may seem like minor issues, however, such capabilities were vital in order to maintain health within a hospital. Compared to those accounts prior to the introduction of a nursing body, particularly the fate of those soldiers wounded at the battle of the Alma, it is clear that these improvements were of great import in preserving the life of the sick and wounded. Indeed, alongside the numerous first-hand accounts of the advantages of a professional body of nurses, the sharp decrease in mortality evident by the second winter reveals the importance of the improvements in nursing for the prevention of disease.[176]

There is also record left of the condition of Crimean War hospitals by some of those ladies of the nobility who volunteered to serve within them. One such record, '*Eastern Hospitals and English Nurses*' gives the account of one of these Lady volunteers who served in the hospitals of Koulali and Scutari. This account grants a view of operations at Koulali, although the author focuses in great detail on the character of those nurses and orderlies who were not of noble birth and the nature of the religious services offered, her account also succeeds in presenting the decline of the hospital at Koulali, as better options were planned and enacted. She notes that by June 1855 they had almost entirely stopped receiving patients at Koulali, she attributes this to a decision from headquarters "the medical and other authorities at head quarters had determined to keep the sick

[175] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* pp.188-189.
[176] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* pp.43-44.

as much as possible in the Crimea, considering the air there best for them, and the voyage down unadvisable.*"*[177] This is not the only explanation which the Lady in question gives to explain the decline of the hospital at Scutari, she also makes note of the general hospitals which had been established within the Crimea, particularly noting the Castle and Balaclava hospitals and an increase in the number of regimental hospitals which were able to care for patients. More telling than all of this however, she notes that "except for the attack of the 18th of June, the health of the army was far better than had been expected." [178] By this point in the conflict, many of the issues of supply and organisation had begun to improve. This improvement prompting many of the hospitals on the Bosphorus to be less heavily used, indeed, she states that these hospitals were generally less than half full, most of those who were admitted to these hospitals were admitted prior to being invalided back to England.[179] The accounts of this particular Lady volunteer show that by the second half of the war in the Crimea, the weaknesses of shipping the sick and wounded to hospitals so far from the action appears to have been noted and avoided, which led to the decline of this poor practice, excepting where those patients would then be shipped to England having been declared unfit for further service.

The accounts of the Sisters of Mercy provide some limited evidence of the efficacy of reform, however, they are more valuable as either a counterpoint to the reports of Nightingale, or in their earlier examples, as a base point from which to examine the changing nature of the military hospitals of the Crimea. The account of Sister M. Aloysius Doyle of the Sisters of Mercy reveals the state of the hospitals on her arrival. Doyle writes in her letter dated January 1855, a month

[177] *Eastern Hospitals and English Nurses*, p.150.
[178] *Eastern Hospitals and English Nurses*, p.150.
[179] *Eastern Hospitals and English Nurses*, pp.150-152.

remarkable as having the highest number of deaths from disease occur within the British army,[180] that her first day spent in the hospitals of the Crimea revealed the great privations faced by the wounded. Indeed, her account of the conditions of the hospital is a haunting one:

> Vessels were after arriving and the orderlies carrying the poor fellows…
> Where are they to go? Not an available bed. They are laid on the floor one after another, till the beds are emptied of those who are dying of cholera and every other disease.[181]

This account is only a glimpse of the suffering which Sister Doyle describes. She also mentions the state of filth the patients often arrived in, unwashed and vermin infested, her accounts of the cholera and the frostbite are truly gruesome, all of this upon her arrival and early works at Scutari. Although Sister Doyle does not labour to note specific examples of improvement, throughout the course of her journals, less privation is noted, and more time is dedicated to matters of faith. However, Sister Doyle does mention some specific improvements, one example being the use of what she believed may have been a new kitchen at the general hospital in Balaclava, and much later on a decrease in patient numbers.[182] However, Sister Doyle notes a somewhat negative perception of the work and organisation of Florence Nightingale,[183] and may not wish to attribute improvements to her. The accounts of Sister M. Joseph Croke, go into greater detail regarding the animosity between the Sisters of Mercy and Florence Nightingale. Sister Croke makes particular note of the 'determination' of the reverend mother to not recognize

[180] *Medical and Surgical History, Crimea 1854-55-56, Vol. II*, p.43-44.
[181] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, pp.19-21.
[182] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, pp.34-35.
[183] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, p.47.

Nightingale's authority, and refers to the sisters as having escaped the 'fangs' of Miss Nightingale.[184] Sister Croke writes very briefly of her time in Scutari and Koulali, Koulali being the hospital which was primarily in the care of the Sisters of Mercy. She focuses primarily on the time of the Sisters of Mercy at the general hospital of Balaclava. This is particularly interesting, as the hospital of Koulali had the highest rate of mortality to admissions among the Crimean hospitals. This is however to be expected, as the hospital at Koulali was in British hands only from February of 1855 through to June of 1855. This period encompassed most of the months with the greatest number of hospital admissions and the greatest mortality over all. The hospital of Koulali, unlike the other hospitals, lacked the periods of relative calm which would have lowered the overall rate of mortality at other hospitals. It is not surprising, that as a hospital only open during the busiest periods of the conflict, that Koulali would have the highest rate of mortality to patients admitted. With that in mind however, the conditions at Koulali were certainly still very poor and the hospital suffered greatly from the effects of cholera.[185] The accounts of the Reverend Mother herself, Mother Francis Bridgeman go into great depth regarding her correspondence with Nightingale, and also reveal the grievances she had regarding Nightingale's administration. Indeed, a decent proportion of her journal entries are either critiquing Nightingale's accounts of the reform or condemning her actions, administration and nurses.[186] This ill feeling between the Reverend Mother and Nightingale provides a counterpoint to a lot of the accounts of Nightingale's reforms, and also can be seen to represent the conservative backlash to reform at a class level. Nightingale's nurses being those who chose to work in the profession of nursing for pay, rather than from a sense of purely moral duty.

[184] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, pp.77-81.
[185] Lynn McDonald, "Florence Nightingale, statistics and the Crimean War", *Journal of the Royal Statistical Society*, 177, part 3, (2014): p.580.
[186] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, pp.213-233.

Although this meant Nightingale's nurses were those who met with her standards of nursing, their moral standard was not acceptable to the Sisters of Mercy. Mother Bridgman often refers to her communications with Dr Hall, and how happy he was to support her against Nightingale. Indeed, Mother Bridgeman's first response to a general order given in 1856 which granted Nightingale certain powers regarding the transfer of nurses, was to note how upset that made Dr Hall and the medical authorities of the Crimea.[187] Indeed, Dr John Hall wrote very critically of the work of reformers and of what was being said of Nightingale in the media of the time. Hall arguing their lack of merits stating that:

> Certainly the Government has fostered these high pretensions by sending out pathologists, sanitary commissioners, and I don't know what 'issioners, with high salaries and no occupation. Then we have the female Inspectors and Directors of Nurses, and I don't know what besides. [188]

Dr Hall's criticism of the sanitary figures of the conflict, including the nurses and those involved in the improvements in hospital hygiene reveals again how out of touch the British Military Medical Department and its hierarchy were with the overall affairs of the army. Dr Hall's criticisms continue, as he carries on in the same letter to note that while the health of the army was generally good, that this was not the result of what he considered to be the excessive medical spending of these additional medical figures and 'I don't know what 'issioners'. Hall appears to

[187] Mari Luddy, *The Crimean Journals of the Sisters of Mercy*, p.222.
[188] Sir John Hall to Andrew Smith, November 10th, 1855, Headquarters Camp, Crimea, S. M. Mitra, *The Life and Letters of Sir John Hall*, p.402.

claim that this increase in spending was nothing but excessive luxury being wasted on the sick, singling out the hospitals at Scutari, Hall notes that:

> Men get credit nowadays for the amount of their expenditure; but anyone acquainted with Army hospital management knows what abuses this leads to, and then these Lady Bountifuls add to the confusion. Dr Jameson, who has just come up from Abydos, amuses me by the account of the patients and convalescents sent down to Abydos from Scutari. He said when they came there they demanded porter and two kinds of wine daily as their full diet, and when told it could not be allowed they seemed somewhat disposed to take the law into their own hands, because they said they had been allowed it at Scutari, and as they had fought and bled for their country, they did not see why they should not have had the same there.[189]

This backlash against the emerging changes in the army through its employment of a sanitary service and against any degree of control being given to professional nursing reveals the unwillingness of the British military to adapt in spite of the evidence of success, particularly as the letter being sent was from Dr. Hall, Inspector General and Principle Medical Officer of the Crimean Force[190] to Dr. Andrew Smith, Director-General of the Medical department. The almost childish complaints from the highest British medical officer of the conflict to the highest medical officer of the British army in general reveals this stubborn resistance to change in full form.

[189] Sir John Hall to Andrew Smith, November 10th, 1855, Headquarters Camp, Crimea, S. M. Mitra, *The Life and Letters of Sir John Hall,* p.404.
[190] S. M. Mitra, *The Life and Letters of Sir John Hall,* p.303.

Accounts from the battlefield and from those who worked upon them also show a general improvement in the health of the army over this period. The accounts of Dr Douglas Reid, an assistant surgeon during the Crimean War, discuss some of the issues faced by those serving at the front. Reid himself having been an assistant surgeon with the 90th Perthshire Light Infantry,[191] he provides a perspective from amongst the infantry as well as from a medical perspective. In addition to these, he also reveals a brief snapshot of the hospitals at Scutari, as after being struck down by fever himself, he spent a month recuperating at Scutari, and, as he bitterly notes, performing the duties of an assistant surgeon there. During the second and last great spike in the rates of sickness and mortality within the campaign,[192] the period of June to August 1855, Reid notes that: "We have a little cholera here notwithstanding that every means are tried to keep the camp clean. We are pretty healthy in the 90th".[193] Reid indicating in his letter that health within his regiment was improving, although as he notes, there was still some cholera. Reid does not comment in detail regarding the rest of the army, although he does comment on the health of the command of the army. After noting the illness of Lord Raglan, General Brown, and Pennefather, he stated that "All the generals are getting seedy: it would be a good thing if they sent out a new batch, the present ones are worn out."[194] Unfortunately for Reid, he was also struck down with illness during this period, although unlike the unfortunate Lord Raglan, Reid was to survive. By mid-July, the period of highest hospital admission rates within the second spike, but lowest mortality due to disease,[195] Reid notes that although the rate of sickness within

[191] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid* pp.1-3.
[192] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.44.
[193] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid*, pp.99-100.
[194] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A.* Reid, p.101.
[195] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* pp.43-44.

the 90th was quite low among the men, among the officers it was increasing. The colonel of the regiment, along with two captains and two lieutenants were heading to Scutari hospital with dysentery or fever.[196] By the 27th Reid also fell ill and by the 7th of August, he had followed them to Scutari, by his account as a "perfect bag of bones*"* hoping to recuperate from what he referred to as Crimean fever.[197]

Reid's experiences at Scutari reveal to some extent the differences between the general hospitals and the medical care able to be offered at the front. Although not a patient at the general hospital, as Reid was set up in a house to recuperate until he could return to duty, Reid still served light duty within the hospitals during his stay at Scutari. Reid was of the opinion that the climate at Scutari was not suited for recovery, indeed he described it as "depressing and weakening" however, he still declared it to be "decidedly better than camp for a sick man."[198] This he declared in part to be due to the ability to sleep within sheets, the advantages of having four walls and a roof and indeed the amount of fruit available. Indeed, Reid's account of conditions continues to improve until the end of the war, by October Reid declares his camp "[e]xtremely healthy at present",[199] with only 5-6 men in hospital. By January of 1856, the second winter spent within the Crimea, he mentions that in order to keep warm the men were engaged in snowball fights, and although he notes the miserable state of the French during this period, he mentions that: "Our men were as jolly as possible."[200] This is a far cry from the first winter spent in the Crimea. Not only does Reid's description mention no hardship greater than a want of fresh

[196] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid,* p.103.
[197] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid*, 1855, p.105.
[198] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid*, 1855, p.106-107.
[199] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid*, 1855, p.117.
[200] J. Baylen and A. Conway, *The Crimean War Letters of Dr. Douglas A. Reid*, p.127.

supplies resulting in tough meat, but his general notes on the attitude of the men and the luxuries available to the army show an almost entirely different world to that faced by the British Army during the first winter. This account reveals the great improvements made within the space of a single year. Improvements that lowered the rate of mortality from 9.49 percent of the army succumbing to disease during the previous winter, down to a mortality rate of 0.17 percent succumbing to disease.[201]

Additional accounts from the front confirm the improvements evident in the accounts of Reid. Temple Godman's accounts span the entirety of the conflict, including the initial dispatch to Varna, and his accounts detail the progression of sanitary and organisational improvements. His early accounts through Varna and the Crimea reveal much in the way of privation and suffering, indeed he is quite outspoken regarding the suffering at Scutari and the hospitals in 1854. He writes scathingly about the appalling conditions aboard the ships waiting to make the voyage to the hospitals after the battle of Alma "the ship crowded with men shouting for water etc., and no one to attend to them…. Of course numbers die, while the ship is waiting for her full cargo."[202] His accounts of the first winter, that first great spike in mortality,[203] reveal even greater hardship, particularly the issues caused by lack of shelter and those issues which affected the ability of the cavalry to function, like the emaciation of their horses due to a lack of forage.[204] Most of the distress Godman records from the first winter is, however, the distress of other people, Godman himself receiving everything from food to new boots and socks from his relations with some

[201] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* pp.43-44.
[202] Temple Godman to 'My dear Father' October 19th 1854, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.72.
[203] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* pp.43 -44.
[204] Temple Godman to 'My dear Father' November 22nd 1854, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.90; Temple Godman to 'My dear Father' November 27th 1854, Philip Warner, *The Fields of War, A young Cavalryman's Crimean campaign,* pp.94-96.

regularity. Godman places the blame for the poor organisation and terrible conditions on the shoulders of Lord Raglan initially, and a lack of housing later on Lord Lucan, however, within his letters he criticized many around him, from the officers of his regiment to the commissariat and his Turkish allies. In spite of this he speaks favourably of the French during this first winter, noting that:

> The French do everything for us, they make our roads, carry up our shot and shell, and bring down our sick, it is really sad to think that through mismanagement we should come to this, and if this is the way we shall help our Allies, they will soon wish to be without us.[205]

By the second spike in mortality, of July 1855, Godman mentions the suffering of the army only briefly, commenting that:

> It is quite extraordinary the way the new arrivals from England are struck down from cholera, fever and dysentery, hardly one escapes, tho' many have it less severely than others, nor do the old hands escape entirely, though it is in general less virulent and less frequent with them than the newcomers.[206]

The conditions of the second winter are again shown to have greatly improved from the first, Godman writing of the withdrawal from the Crimea through this time, and though noting in

[205] Temple Godman to 'My dear Father' January 8th 1855, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.122.
[206] Temple Godman to 'My dear Father' July 16th 1855, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.169.

October that if the cavalry were not allowed to withdraw from the Crimea during the winter that "They will nearly all die if left here and John Bull will lose another million or two".[207] By the onset of the winter itself, Godman and most of the cavalry had already left the Crimea, and were encamped at Scutari in the Hayda Pasha Barracks. Although Godman characteristically complains of the snow there as well he also mentions the suffering of the French remaining in the Crimea at this point, noting that their roads had failed and their supplies were so poor that they had to eat the rats killed in the British camp[208] this before carrying on to note that the house he was staying in was unacceptable, as was the offered barracks accommodation. Temple Godman's accounts reveal clearly the improvement of the living conditions of the army, at least within his regiment, but even so, he still stresses the need for the cavalry to withdraw rather than subject the horses and men to another full Crimean winter.

Temple Godman's regiment, the 5th Dragoon Guards official records appear within the Medical and Surgical History of the British Army which served in Turkey and the Crimea. Within these records are the medical records for this regiment, compiled in quite a degree of detail. As Godman's regiment was present for the whole conflict, these records provide a decent example of the rate of mortality among a cavalry regiment during this conflict. In addition to the length of their service, the fact that the 5th Dragoon Guards were not caught up in the charge of the light brigade at Balaclava, means that the mortality rate was not disrupted by the great losses caused to other cavalry regiments as a result of this charge. The records of this regiment during its time in Varna provide a detailed account of the land upon which the regiment camped, and indeed the

[207] Temple Godman to 'My dear Father' October 27th 1855, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.188.
[208] Temple Godman to 'My dear Mother' January 14th 1856, Philip Warner, *The Fields of War: A young Cavalryman's Crimean campaign,* p.196.

movements of the regiment after disease set in in various locations. In many cases this move was due to the belief that the land within which the regiment was camped was unhealthy. The first of these was an area of land which was considered to be marshy during more wet seasons near Devna lake, this site being blamed by the surgeon of the fifth dragoons for much of the cholera which beset his regiment. "I fancy the exhalations of the Devna Lake had much to do in the production of the latter disease [cholera] in the Devna camp, those corps having suffered most which were nearest in proximity to it."[209] It is further noted within this report that the river Devna was also a cause of poor health, as it quickly became contaminated from the watering of horses and buffaloes, the laundry of the army and the location of a slaughter house on its banks.[210] Within the month of July, it was noted that in the town of Pravadi, a town some nine miles away from the campsite, there was an outbreak of a disease which the locals were reported to have called "Black Death" but which was believed to have been a very severe form of cholera.[211] Although cholera broke out in the Devna camp in early July among the infantry regiments, it did not break out among the 5th Dragoon Guards until much later in the month, their first death from this disease occurring on the 25th of the month, some fifteen hours after the unfortunate soldier's admission to hospital.[212] After this outbreak of cholera the 5th Dragoons were again moved, this time to a campsite on a level plain called Kotlubie. Here the regiment suffered from several cases of fever but only one fatality as a result of cholera. This practice of constantly moving camps was maintained in an attempt to prevent disease from taking hold of the regiment, by not remaining on unhealthy ground, unfortunately this method was not successful. Much was made of the effects of breezes, vegetation and temperature in the medical

[209] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.12.
[210] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.12.
[211] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.12.
[212] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.13.

report as an explanation of the cause of disease. At one camp in the Crimea in September of 1854 a sharp increase in remittent fevers was attributed entirely to the prevalence of a strong sea breeze in their new camp, it being noted that when "the land breeze set in, no more instances occurred."[213] The *Military Medical History's* later description of methods used to prevent cholera make specific note of the method of moving camp grounds, noting that "frequent changes of encampment ground were also made in the hope of escaping from the range of the epidemic influence".[214] However, as cholera was not entirely understood and this method did not appear entirely effective, in some cases it reduced the effect of a cholera outbreak, and in others the outbreaks continued or even got worse, the report formed the conclusion that:

> The discrepancy of result, here presented, it is difficult to explain; but we would infer from it, that cholera has a tendency to pursue a certain course, that this course is in part influenced by the locality in which the outbreak of the disease occurs, and that the observed effect of removal from locality depends upon the period of the epidemic in which it is made; but that it is probably beneficial in many instances, since it appears so in some, and certain localities, which we can describe, are known to encourage disease.[215]

By August a much greater number of hospitalisations began to occur from cholera, fever, and diarrhoea. The regimental surgeon and the commanding Major both took ill with diarrhoea, and the senior captain fell ill with cholera. The constant shifting of camp not only failed to prevent

[213] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.17.
[214] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.62.
[215] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.63.

the virulence of disease, but it also caused concern among the men, at one time believing that the location they were in was the site upon which many Russian soldiers had died of cholera in 1830.[216] This combined with poor and irregular diet created the conditions within which disease thrived. During August 195 men of the regiment, 76% of the total strength received hospital treatment, of this some 35 deaths occurred, which constituted 13% of the regiments total strength.[217] This regiment, before being engaged with the enemy, or indeed even sighting the enemy, had already lost a total of 13% of the regiment due to sickness, and of the 18 officers it began with, only 11 remained with the regiment at the end of this month. Among this group of officers, its commanding major had left because of his illness, while the surgeon, veterinary surgeon and senior captain had all died. The command of this regiment had been so shattered by disease that it had to be temporarily commanded by the commander of the 4th Dragoon Guards.[218] The regiment continued to have high hospital admission rates until February of 1855, although mortality rates from disease did not rise so high again within the 5th Dragoon Guards deployment.[219] From January of 1855 onwards, the mortality rate does not increase beyond three recorded deaths in any one month, although hospital admissions were still high at various points. This was explained in various ways, but generally this lower mortality rate was attributed to improved standards, although in some cases acclimatization is hinted at, as it is often noted that those most affected by disease were those who had only recently arrived to reinforce the regiment. By the later months of the deployment, fever and diarrhoea were the major reasons for hospital admission. Throughout the course of the conflict it was noted that 421 patients had been admitted to hospital as a result of either common or remittent fevers, of which 17 were fatal. Of

[216] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.63.
[217] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.14.
[218] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.14.
[219] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* pp.18-19.

general diseases of the bowels, by far the most common being diarrhoea, there were 16 deaths, all from either acute dysentery, chronic dysentery or diarrhoea. Cholera however, although noted as the cause of only 67 hospital admissions, was to cause the greatest number of deaths, being responsible for 42 of the total of 72 deaths from disease within the regiment.[220] There were 543 men and 30 officers deployed of the 5th Dragoon Guards, nearly half of this number consisting of reinforcements sent during the campaign. Of this number, death from combat accounted for two men, along with 31 men wounded and two officers wounded, one of these officers dying of his wounds. In comparison, 79 men and six officers died of disease. 72 men and nine officers were invalided back to Britain, 30 men were 'discharged of service', only four as a result of wounds, two through accidental injury, and 24 as a result of disease.[221] Disease was clearly the greater scourge, although much decreased in the harm it was able to cause by the conclusion of the conflict.

The conditions within which the cavalry existed were significantly better than those faced by the Infantry within this campaign, cavalry existing as a more valued and elite branch of the army. The infantry bore the brunt of the poor conditions within the Crimean War, as indeed, they bore the brunt of the fighting. The 1st Batallion of the Coldstream Guards, like the 5th Dragoon Guards, was also present within the campaign from its onset to its conclusion. Their numbers were also much greater, the total sent to the conflict numbering 2060 soldiers with 85 officers.[222] Of this total number, the initial force consisted of 35 officers and 919 soldiers, the remainder were sent to reinforce the regiment throughout the campaign. Only three officers and 269 men

[220] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* pp.18-19.
[221] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.17.
[222] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.121.

served throughout the entire campaign.[223] The regiment itself faced staggering losses, as many as 12 officers and 699 deaths within the force, 564 of which were due to disease, and of those deaths from disease, 364 occurred either at general hospitals or aboard ships. In addition to these deaths, 187 more soldiers were invalided back to Britain due to disease, compared to only 65 from wounds. The breakdown of most lethal diseases amongst the regiment places some 22.97% of deaths as having been caused by fevers, 43.74% to dysentery and diarrhoea, the majority of those to diarrhoea, and 15.69% to cholera.[224] Throughout the campaign, although the rate of mortality amongst the 1st Coldstream Guards from preventable causes was tragically high as with the 5th Dragoon Guards, their overall state of health improved as the organisation of the army improved. This is clearly shown within the medical returns of the regiment. Although these medical returns show similar trends to those already discussed, they still reveal the path of various diseases, typhus, for example was one of the most lethal fevers at the beginning of the conflict, which began with high admission and mortality rates in June and August of 1854 after which it progressively began to die out. By March of 1855 it appears to have entirely died out, to be replaced briefly with remittent fever and then continuous fever at a much lower mortality and admission rate, which also progressively declines. Indeed, for the six months of 1856 there are only three deaths from any sort of fever recorded within the 1st Coldstream Guards out of 25 hospital admissions.[225] Whereas in 1855 the mortality figure for these same six months was 20 dead with 171 hospital admissions.[226] By the later period of the campaign, after the myriad of improvements had been initiated by the sanitary department, rates of all key diseases can be seen

[223] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.121.
[224] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* p.121.
[225] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* Admissions into Hospitals and Deaths from 1st May, 1854, to 30th June, 1856, pp.122-123.
[226] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* Admissions into Hospitals and Deaths from 1st May, 1854, to 30th June, 1856, pp.122-123.

to have declined. Mortality from diarrhoea had dropped to almost nothing by April of 1855, although admission rates remained high until October of the same year.[227] This suggests that improvement in medical care may have been established earlier than improvements in overall conditions. However, the clear trend established is a steady decline in mortality, followed by the clear decline in admissions common amongst all major diseases from the period in which reform can be seen to have begun.

There are however, some objections among historians regarding an overall improvement in conditions as a result of sanitary intervention. In particular, this group aims to criticize the role of Florence Nightingale as a reformer, arguing instead that she caused more harm than good. The most notable example of this position is the biography of Nightingale, *Florence Nightingale Avenging Angel*, written by Hugh Small. Small goes so far as to postulate that the illness Nightingale suffered from after the Crimean War which left her bedridden, was simply guilt causing a mental and physical breakdown because of all the harm she had supposedly caused.[228] Indeed, Small contends that Nightingale's arrival, because it coincided with a rise in mortality for four months, was the cause of this rise through a lack of sanitary practice. Small, ignored here the significant cholera epidemic which can be identified within this period, and as noted earlier, the discordant state of the Medical Department and the commissariat upon Nightingale's arrival. This school of thought has also in some cases argued that the decline in mortality rates amongst the British force was either the result of a milder epidemic, or indeed, of a milder second winter. Small himself notes that a milder second winter was one reason for a decrease in mortality, but

[227] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* Admissions into Hospitals and Deaths from 1st May, 1854, to 30th June, 1856, pp.122-123.
[228] Hugh Small, *Florence Nightingale Avenging Angel,* (New York, St. Martin's Press, 1998), p.3.

not the entire reason. He cites the French increase in deaths during this period, although he cites another historian, Longmore, rather than the source of his medical statistics, which were likely those of Dr Chenu.[229] Indeed, Small's lack of reference to statistical primary sources shakes his credibility as much as his frequent omissions of major events.[230] Small omits Nightingale's medical study at the Kaiserswerth institute,[231] noting that her only medical training was a brief period as a hospital superintendent. His reliance on a conspiracy of destroyed secret letters to justify a number of his assertions weakens his position.[232] The suffering faced by the French army during this period clearly illustrates that the second winter was no milder than the first. It is clear, not only from the accounts of Temple Godman which were cited earlier as evidence of the suffering of the French army, but also from the statistical accounts of the French army itself. These accounts, given by the French Dr Chenu, who heavily references Dr Baudens, the Medical inspector to the French army in the Crimea, clearly reveal that the second winter and epidemic were not simply of less account than the first. Indeed, this evidence reveals that over the second winter the losses in the French force increased from their first winter, rising from 89,885 hospital admissions and 10,934 deaths in the first winter, to 106,634 hospital admissions and 21,191 deaths in the second winter. Of these deaths those from Typhus rose the most, up from 90 in the first winter to 10,278 in the second, nearly the same amount as died in the first winter overall.[233] This trend can be seen to be the exact opposite of the evidence of the French records of the mortality of the British force, which place hospital admissions within the first winter among the British army at 47,749 and deaths at 10,989, and in the second these rates have dropped to

[229] Hugh Small, *Florence Nightingale Avenging Angel,* (New York, St. Martin's Press, 1998), p.54.
[230] Lynn McDonald, "Florence Nightingale, statistics and the Crimean War", *Journal of the Royal Statistical Society*, 177, part 3, (2014): p.576.
[231] Hugh Small, *Florence Nightingale Avenging Angel,* (New York, St. Martin's Press, 1998), pp.15-19.
[232] Hugh Small, *Florence Nightingale Avenging Angel,* (New York, St. Martin's Press, 1998), pp.118-130.
[233] Jean Charles Chenu, *On the Conservation of Armies on Campaign*, p.131.

27,384 hospital admissions and only 606 deaths.[234] Chenu considers that this improvement in the British force was the inevitable result of reform, and the British Military Medical Department's ability to request improvement, or as he explains it:

> the British Doctors, in preserving their patients, obviously preserved themselves too. They had, like the US doctors, the authority, initiative and responsibility in their hands, whereas the doctors in the French army, as we have said, were merely agents of execution, without authority, initiative or responsibility.[235]

Indeed, Chenu notes those in particular he believes to have been instrumental in the ability of the British army to adapt after the first winter, making particular note of the administrative efforts of Nightingale. Chenu's summation of Nightingale provides further support for her actions:

> The problem was how to conserve an army placed in exceptional circumstances; and so exceptional measures were needed; above all it was a problem of general hygiene and food. Miss Nightingale was inspired only by good sense and medical competence: she sought and gained the advice of the competent, and once enlightened her management overcame the obstacles; faced with imperious needs, she knew only the first article of the rulebook, the welfare of the army, and the results obtained tell us very well whether her

[234] Jean Charles Chenu, *On the Conservation of Armies on Campaign*, p.131.
[235] Jean Charles Chenu, *On the Conservation of Armies on Campaign*, p.133.

> administration was good from the humanitarian and economic points of view.[236]

Chenu, as one of the primary compilers of statistical evidence relating to the Crimean War, supports the view that the administration and reform of Nightingale was a vital, even primary reason for the improvement in the health of the British army. Small's assertions, and those of his line of argument seem universally to ignore the overwhelming statistical evidence in support of the administrative sanitary reforms which took place within the British army during the Crimean War. The reduced suffering amongst the British forces was the result of an improvement of conditions, and indeed, of diet and supply. These preventative measures closely mirror those argued by the British sanitary movement, and it is clear that many of these suggestions were drawn from those of the sanitary movement. Within the Crimea these preventative measures yielded clear results, reported on in the public eye and backed by statistical evidence.

The reforms themselves which led to such improvements were the product of the Sanitary Commission, Nightingale, and likely experience gained from the previous year's tragic mistakes. Unfortunately, as with the 1863 Indian reform, it can be very difficult to highlight exactly what actions were taken to improve the situation. How the improvements in supply and conditions were felt by many of those who were present in the conflict has already been attended to, and beyond this, there is no universal account which explains all of the actions taken. In spite of this, there are some things which can be claimed with authority. Nightingale goes into significant detail regarding the improvements in supply, particularly noting what was provided by the *Times*

[236] Jean Charles Chenu, *On the Conservation of Armies on Campaign,* p.137.

fund and other distributors. Her meticulous record in this regard she then used to provide evidence to support recommendations regarding the necessities required by a British army to prevent unnecessary deaths. The existence of the *Times* fund and charitable support also very clearly improved conditions within the British army overall. In addition to this, measures to ensure the efficacy of supply were taken, such as the construction of a transport rail to ensure supplies reached the army. These actions alleviated the privation of basic necessities which had until this point ensured both unsanitary conditions and decreased the ability of the soldiers in the Crimea to resist illness. The introduction of a body of professional nurses and orderlies can also be seen to have improved the standards at the military hospitals, although the introduction of female nurses remained a point of controversy, even among those who volunteered to assist. Nightingale herself recommending, rather than bringing in female nurses to military hospitals, the establishment of professional orderlies made up of the best of the army. These hospital improvements can be seen to include basic standards such as hygiene and the preparation of appropriate meals to aid the recovery of the sick and wounded. Unfortunately, the exact nature of many of the actions taken and improvements made may not have been suitably recorded. However, regardless of the extent of sanitary improvements which occurred during the campaign itself, the conflict allowed examination of several theories, and provided hard evidence to those involved that improvement was possible, and that modern sanitary theory was a suitable way to attain it. Indeed, from this conflict came many of the discussions and recommendations which would later shape the growing sanitary department and the statistical evidence collected by the various medical professionals involved allowed these recommendations to carry a heavy weight of justification.

Chapter 4, 1863 Indian reforms

"India is essentially a great military monarchy, always equipped for war, and often at war – an empire in which the army is always visible, and its health and contentment ought to be the first object of administrative care." Sir J. Ranald Martin[237]

Introduction

The proposals for reform mentioned in the *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India* in 1863 were extensive. They covered everything from recommended uniform fabrics and the space allocated each soldier in a barrack room to the purity of water being transported to camps and the need for a uniform latrine system. This chapter focuses primarily on providing detailed analysis of the reforms proposed in 1863 in relation to India. This analysis will include consideration of the recommendations which emerged from the 1863 report, with particular focus on what was deemed to be of immediate necessity to make the maintenance of British rule possible. This is followed by an examination of the degree to which these recommendations were accepted and utilised by the colonial administration of the time.

Justification for reform

[237] Sir J. Ranald Martin, "The Sanitary History of the British Army in India, Past and Present, no. I. General observations" *The Lancet*, January 4th (1868).

The *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, which outlines the proposal for reform, begins by attempting to defend the possible efficacy of sanitary reform within the Army in India. Detailed comparison is given between rates of epidemic disease between those members of the army serving in Britain and those serving in India. It was noted that almost all disease had a higher prevalence and rate of mortality in India, the only exceptions given being phthisis, scrofula and cancer. These conditions had a longer duration, and the commissioners noted that those suffering from these diseases were typically invalided back to Britain to die. For all the other diseases listed, the infection and death rates for India remained higher. These diseases ranged from fevers to dysentery, cholera, liver diseases, rheumatism, diarrhoea, delerium tremens, cattarh, syphilis and scurvy.[238] However, the diseases considered to be the greatest scourge were divided into the categories of 'fevers', dysentery and diarrhoea, diseases of the liver, and cholera. These are the diseases most targeted by the commissioner's recommendations. The commissioners discuss these illnesses in order to explain what it is they are trying to prevent, and a detailed understanding of their perceptions of these diseases grants insight into their justifications for reform. Their report goes into detail regarding the threat of these diseases and their prevalence in various parts of India. This was established through collection and analysis of medical records relating to the diseases which effected the British Army in India, and using these figures, the commissioners are able to present a case for the improvement of the conditions faced by the army.

Fevers, as a category encompassed a wide variety of illnesses, the concept put forward in this report was quite broad. The term 'fevers' would certainly include malaria, but also to a variety of

[238] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.28.

other illnesses including typhoid, relapsing fever, typhus, scarlet fever, smallpox and measles.[239] There are many arguments regarding which fevers can be considered as similar or different from one another, specifically regarding causal factors like climate or whether or not they can be considered contagious during this period.[240] As a result of this broad definition, the classification of 'fevers' within the commissioners' report can be quite unhelpful when trying to examine the cause and nature of an illness. This is increasingly difficult, as the figure given in the Commissioner's report by Sir Ranald Martin, is that 50% of all hospital admissions in India were due to fever, and that within the Bombay Presidency, 40% of all deaths were also attributable to fever.[241]

The next classification of illness within the Commissioner's report is described as dysentery and diarrhoea. Dysentery was certainly a known scourge of armies and the military in general, and was particularly concerning in India with its high rate of mortality. Dysentery was closely linked to fever within this report, a note being made that "where fevers are present dysentery is never far off. "[242] Dysentery and diarrhoea are also noted to have had a lower prevalence than fever but a higher rate of mortality. Sir Ranald Martin is quoted again within the report as stating that the rate of dysentery between British soldiers and their Indian counterparts was at a rate of eleven to one. Dysentery is noted as the greatest cause of death overall amongst the British forces serving in India, the average out of every 100 deaths attributed to dysentery and diarrhoea being 32.441, while fevers were at 23.054 and diseases of the Liver and cholera were lower still at 9.597 and

[239] Margeret Pelling, *Cholera, Fever and English Medicine*, p.3.
[240] "Enteric Fever in India," *The British Medical Journal*, Vol. 2, No. 1091 (1881): pp.872-873.
[241] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.
[242] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.

10.320 respectively.[243] It is also noted that the majority of deaths from dysentery were from those dying on ship whilst being invalided home. Where these illnesses are often thought of as being short term, the report notes that dysentery often became a chronic condition, lasting for years with very little in the way of favourable prospects remaining to the sufferer.[244]

The listed category with the lowest attributed death rate was that given the title 'diseases of the liver'. However, the commissioners themselves note that of this category no really accurate figure can be given, as diseases of the liver often occurred as complications arising from fever, cholera or dysentery, and often the cause of death was listed as applying to one of these headings. Whether or not 'diseases of the liver' is a useful distinction in this case is arguable, however, it appears to be categorised primarily by inflammation of the liver, which could be considered a symptom of other illnesses rather than a disease in its own right. This category can also be seen to be connected with the excessive alcohol consumption common of the soldiers in India. Indeed, temperance is considered much later within the commissioners' report as a primary method of preventing unnecessary illness.[245] The standard ration allowed to be purchased from the canteen is given as two drams of spirits, generally rum or arrack a day, or in place of a dram of spirits a quart of malt liquor. The report notes that two drams of spirits is the equivalent of one twentieth of a gallon, this would make 230 millilitres of spirit per day as the maximum allowed ration, or just under two litres of malt liquor.[246] This somewhat excessive drinking is very likely to have been a significant cause of liver disease, which may have been

[243] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.28.
[244] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.26.
[245] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.118.
[246] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.118.

incorrectly considered to have been a disease in its own right, rather than a symptom of poor diet and other illnesses.

The final category listed was that of epidemic cholera, that disease which caused such hardship in the Crimea. The description given of epidemic cholera is worth giving verbatim, as it describes the nature of the disease and the manner in which it was viewed. "Epidemic cholera is the most acute of all acute diseases, and, like the last mentioned, it always ends in more or less immediate recovery, or in the death of the sufferer."[247] Cholera was a disease of extremes, striking in the form of epidemics, the commissioners' report noting its annual occurrence at a variety of lowland stations often in the beginning of the hot season. Epidemic cholera received almost celebrity status among the diseases of the period, inspiring huge bodies of literature and academic discussion. This was particularly true in Britain, in part due to the numerous fatal outbreaks and cholera epidemics occurring in Britain's urban centres during the period and the high death rate associated with these outbreaks. Margaret Pelling mentions in '*Cholera, Fever and English Medicine of 1825 – 1865*' that the significant focus on cholera of the time was likely due to the abruptness of its onset, as unlike more common illnesses such as fevers and tuberculosis, cholera was not a constant, and so its outbreaks were more striking.[248] Deaths from cholera were certainly well reported on, both in articles and periodicals of the time, and within personal accounts of the Sepoy Rebellion.[249] Cholera was one of the most commonly mentioned causes of death other than combat and sunstroke within accounts of the Sepoy Rebellion. As an individual category, epidemic cholera is one of the most useful within this report, as it is also

[247]*Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.27.
[248] Margeret Pelling, *Cholera, Fever and English Medicine*, pp.5-7.
[249] Mowbray Thompson, *The Cawnpore Man*; William Wright, *Through the Indian Mutiny: James Fairweather. 1857-1858*.

discussed in similar depth within the *Medical and Surgical History of the British Army which served in Turkey and the Crimea.*[250] Cholera itself has quite distinctive characteristics and so less likely to be diagnosed incorrectly. Sir Ranald Martin gives a full description of cholera and the symptoms associated with it in his work '*Influence of tropical climates in producing the acute endemic diseases of Europeans*':

> When once the true cholera has fastened on the patient it proves the most unmistakable of diseases -one case being the counterpoint of all the others- so that an error in diagnosis is here scarcely possible. The disease in its most malignant form is the same in all countries. It is ushered in by muscular debility, tremors, and vertigo, occasional nausea and spasmodic griping pains in the bowels, and marked depression of the functions of respiration and circulation, and a sense of faintness. These signs are speedily followed by copious purging of serous fluid, and this again by vomiting, with a sense of burning heat at the stomach, coldness and sweating, dampness of the whole surface of the body, coldness and lividness of the lips and tongue, cold breath, a craving thirst, a feeble rapid pulse, oppressed and difficult respiration, suppressed urinary excretion, extreme restlessness, blueness of the entire surface of the body, a sunken and appalling countenance, a sunken and peculiarly suppressed voice, a peculiar and indescribable odour from the body, partial heats of the præcordia and forehead; - such are the signs of a fatal collapse.[251]

[250] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.*
[251] Ranald Martin, *The Influence of Tropical Climates*, p.18.

Such a distinctive illness was difficult to misdiagnose, and so unlike the other less well defined categories of illness, cholera grants a constant which can be examined in greater detail to reveal the efficacy of various forms of reform, whereas the broader categories can only be examined in terms of overall deaths due to illness, with less able to be known regarding the cause.

The vast majority of these ailments, the sanitary commission argued, were preventable, and were indicative of a poor standard of sanitation. The commissioners provided detailed analysis to explain and justify their claim that most of the loss of life in India due to disease was preventable. Indeed, they argued strongly against the traditional view that the climate of India itself was simply hazardous to the health of an Englishman. They presented this point in various ways, but their most compelling argument was made through the use of statistical evidence. Much like the Edwin Chadwick's analysis of the sanitary condition of the labouring population of Great Britain, the differentiation between rates of mortality between those of various social classes was used to provide evidence that external factors alter the rate of mortality. In this case, the analysis of the commissioners revealed that conditions and not climate, were the primary contributing factor to the high rate of mortality from disease. The most striking example given is the difference in mortality between members of the officer class and common soldiers. The report notes that:

> The mortality of the officers who were stationed with the British and native troops (regular and irregular) all over India was excessive, and involved great losses of life and property; but it was less by 31 in 1,000 than the

> mortality of the soldiers. It follows that the lives of nearly half the soldiers, in less unfavourable conditions, might for the future be saved.[252]

This figure given, is an average across all regions within India including both healthy and unhealthy stations. The death rate given for members of the civil service is even lower, the report notes that within India civil servant's mortality was at a rate higher than 20 in 1000.[253] The commissioners concluded that the primary difference faced by these various groups was standard of living and location, and as such, that the rate of mortality was likely tied to this difference. These figures, even if they do not conclusively prove this point, do at the least show that the rate of death was not simply due to the climate of India; if it were, the death rate among departments would not vary so greatly. The Commission goes on to examine the difference in death rates between married and unmarried officers. Officers would often have their own accommodation in the form of bungalows, and as a result often benefitted from improved sanitary conditions, although the report notes that they still suffered from the same general issues as others in their station.[254] The death rates were also shown to differ significantly between types of soldier. An example the report noted was that of a station near Umballa, between 1847 and 1856, where the rate of deaths between infantry and cavalry revealed a marked difference. Infantry had an average death rate of 55 per 1000, whereas among the cavalry, the rate of mortality was as low as 23 in every 1000, attributed to a difference in duties and living conditions.[255] Most notably the rate given for the deaths among native troops was recorded as nearly identical to that of civil servants. Civil servants having the lowest rate of mortality amongst Europeans serving in India,

[252] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.40.
[253] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.40.
[254] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.112.
[255] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.54-55.

and the best living conditions. Although it was further noted that when serving outside of their own regions of India the mortality rate among native soldiers rose sharply. Their mortality rate being lower when they were able to live in their own huts, as native barracks were organised in the form of separate huts, rather than the large shared barracks of the European infantry.[256] This clear evidence of the advantages gained from more sanitary conditions granted ample justification for the commissioners to claim that with sufficient reform a great degree of human life could be preserved, and with it, the costs of invaliding and replacing soldiers could be diminished. The commissioners further justified their stance by pointing out that previously Britain itself had seem similar levels of epidemic disease and illness, and that it was only through the introduction of sanitary measures which were still wanting in India that such a drastic decline in mortality became possible.[257]

The cost of disease

A drastic decline in the rate of mortality among those British soldiers sent for service in India would represent a significant decrease in the cost of maintaining control over India. This financial incentive was a primary motivating factor given within the 1863 commissioners' report to justify reform. The report does discuss the deaths of officers as a tragic waste of life, noting the "value of the lives of officers, and the irreparable consequences of their loss to their families".[258] The common soldiery however, was discussed entirely in terms relating to the financial and logistical difficulties of replacing them.[259] There was a clear class difference

[256] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.45.
[257] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.57-58.
[258] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.35.
[259] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.32-35.

between the officers and the general body of British soldiers, however this difference in description reveals the great difference in the commissioners' perception of class. The economic cost of sick and wounded soldiers is given in the report as being 100£ per man, as it is assumed that they cost the same as effective soldiers. With a noted rate of ineffectives due to illness at 5,880 on average, the total assumed cost given was 588,000£ annually.[260] The numbers needing to be replaced annually are given at 11 in every 100, and so in order to maintain the British army of 85,856 men, 10,000 recruits would be required per year.[261] Within the conclusion of the report the commissioners state that of a proposed European force of 73,000 men, they would require 5,037 recruits a year in order to fill the vacancies created by death alone.[262] Indeed, the commissioners note that the rate of death between healthy and unhealthy stations can differ from between 11.5 percent to as low as 2 percent, and that if all stations can be brought to the rate of those which are the healthiest, that only 1,460 recruits would be required per year as a result of death. This decrease in mortality would clearly represent a significant decrease in cost. However, not just cost, but the capability of Britain to supply such a number of men at all is questioned, the commissioners noting that "Sir A. Tulloch states that he very much questions whether, with the mortality rate of the last 40 years, it would be possible to keep up an army of 70,000 men in India."[263] The commissioners make it quite clear that not only is a reform in hygiene and sanitation possible, but indeed that it is entirely necessary in order to maintain British interests in India. The commissioners sum up this point very well in stating that "Apart therefore from the

[260] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.34.
[261] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.23.
[262] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.165.
[263] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.166.

question of humanity, the introduction of an efficient system of hygiene in India is of essential importance to the interest of the empire."[264]

Accommodation

Living conditions are a key focus throughout the commissioners' report; the relative living conditions of British soldiers and officers are discussed in great detail and considered a primary cause of the varying rates of mortality. The commissioners note everything from barrack conditions and allocated space, to diet and available leisure activities. The condition of soldiers at various camps and cantonments differed greatly, to the extent that a number of these were considered unhealthy camps overall and Sir John Lawrence suggested that a number of sites and cantonments be abandoned entirely.[265] Cawnpore (Kanpur), the site of several cholera outbreaks during the war of 1857, is mentioned on many occasions as a particularly unhealthy station.[266] The commissioners attempted to examine why some stations are less healthy than others, and they made many recommendations regarding what improvements should be made.

The living quarters of soldiers was one of the primary issues identified by the commissioners. In many cases the barrack rooms within which the soldiers were living were considered inadequate to maintain health. Many barracks were described as fitting too many men into a cramped space with inadequate ventilation or sanitary facilities. As there was no uniformly applied standard for barrack construction other than minimum regulations, there were varying degrees of space for

[264] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.166.
[265] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.206.
[266] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.210.

the inhabitants. Some barracks were designed to hold as many as six rows of beds between the doors on either end of the building. The commissioners measured the available space per man in several ways, they made a note of the superficial feet per man, and the number of cubic feet per man. The number of cubic feet per man in India was by regulation, upwards of 1000 feet per man, whereas the average in Britain was around 600. However, this figure was misleading as noted by the commissioners. In many cases, most of this space was in the air above the head of each man, and in reality their beds remained very close together, often no more than a foot of space between beds.[267] The superficial space per man averaged between 60 and 70 square feet, but in some cases fell as low as 50. One example given was that of Fort William, within which the commissioners note that a space of 140 square feet per bed was the average. However, even with that amount of superficial space, the commissioners note that half of the men in that space would still be too many.[268] As the space between beds was regularly a single foot, the commissioners note that generally every barrack room in India could be considered overcrowded.[269] Deputy Inspector-General Maclean and Dr. Sutherland are both quoted as damning the unhealthy state of overcrowding in barracks.

The report mentions that the largest barracks were likely those at Fort St. George in Madras,

> the lower room is 1,483 feet long by 18 feet wide and fifteen feet six inches high, and holds 400 men; the upper room is 2,124 feet long by 20 feet wide and

[267] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.106-108.
[268] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.107.
[269] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.106-108.

> 14½ feet high, and is intended for above 600 men; the space per man is 1000 cubic feet, and the superficial area from 64 to 69 feet.[270]

Such large barrack rooms were identified as being of significant concern to the wellbeing of the soldiers who inhabited them, primarily due to the difficulties of ventilation and the risks of overcrowding. The larger the barrack room the greater the difficulty of ensuring that it was appropriately ventilated at night, this difficulty only increased with the greater number of occupants for such barrack rooms.[271] The commissioners make a note of the significant risk posed by such large barrack rooms in the event of an epidemic, particularly if they are occupied by the sick.[272] Sir A Tulloch notes that smaller barrack rooms fit for 10 men each would significantly reduce the risk of disease spreading.[273] Sir John Lawrence notes that barracks would be better if they contained half of a company or a quarter of a company instead of an entire company.[274] Deputy Inspector-General Maclean recommends detached bungalows, and makes a note of the significant cost accrued by the construction of large barracks, noting that:

> the system which now prevails in India of erecting costly palaces for troops is one of the most unfortunate mistakes that was ever made, because in the first place, the barracks are so costly that the Government grudges the space required for the men[275]

[270] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.98.
[271] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.99 and pp.103-104.
[272] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.99.
[273] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.100.
[274] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.100.
[275] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.100.

Maclean noted that not only is the current method far too expensive, the construction of these great halls costing more than the construction of smaller dwellings, but that it also creates a greater risk of disease. Maclean carried on to note that the 'Natives' of India do not live in such cramped conditions, preferring separate bungalows and in doing so limiting the effect of disease. In this way Mclean can be seen to be drawing on local knowledge to support his position. Indeed, even among the camps of the Sepoys, soldiers generally lived in huts.[276] The arguments against large and cramped barrack constructions are quite clear, the recommendation of the report states that barracks should in future be constructed so as to contain no more than a quarter of a company of infantry.[277]

However, size and the number of men contained within a barrack were not the only unhealthy element identified by the commissioners. They also stressed the danger of having barrack rooms constructed at ground level. This was identified as a health risk as they argued that the surface of the ground in India was often "charged with Malaria" or bad air.[278] Additionally, they note that 'night fogs' only rise to a certain height as well, and that these also are an indication of various native diseases. This understanding of various forms of disease is supported by several figures, Mr. Montgomery Martin states that in hospitals within tropical regions, the lower levels are unhealthy due to "pestiferous gas rising from the earth in regions where vegetation and moisture exist in excess"[279]. Mr. Julius Jeffreys supported this theory, arguing that it is well established that malaria exists in much higher proportions to those closer to the surface of the ground, additionally noting that "in India all kinds of exhalations are rendered visible by smoke of fog in

[276] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.154.
[277] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.
[278] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.102.
[279] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.102.

cool mornings".[280] Such claims led to a consensus within the report regarding the dangers of malarial mists, and so it was recommended that wooden floors, raised off of the ground as much as possible be established in all future barracks.[281] This they argued would not only assist in diminishing the risk of malaria, but would also aid in both ventilation and cooling.[282] The conception of the dangers of malarial mists is closely linked to the risks associated with ground water and swampy areas, as much of miasmatic theory, discussed the dangers of miasma in terms of decomposing organic matter evaporating from ground water and being inhaled which led to illness.[283] This concern also resulted in calls to significantly increase drainage within stations and the areas surrounding them.[284] Inability to do away with groundwater was so strongly linked to epidemic illnesses that the commissioners note that:

> The evidence given before us, as well as the stational reports, when carefully considered, all go to prove that the drainage of Indian stations on a well-digested plan to suit local circumstances, is a work of urgent necessity for improving the health of the army.[285]

The facilities provided at stations are also shown to have been of significant import to the health of those based at individual stations. Facilities include things like cookhouses, latrines, gardens, workshops, theatres, libraries and gymnasiums. Many of these facilities were recommended to reduce the risk of a soldier relying on alcohol to break the monotony of service in India. This risk

[280] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.102.
[281] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.103-104 and p.168.
[282] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.104.
[283] Margeret Pelling, *Cholera, Fever and English Medicine,* pp.107-109.
[284] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.84-86.
[285] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.86.

was due to the significant amount of time within which the British soldier in India was left idle.[286] Gardens, theatres and workshops were suggested as a means of keeping the soldiers active and preventing the risk of them slipping into a sedentary and unhealthy lifestyle and facing the risks associated with *ennui.* Even gymnasiums and libraries were seen to fulfil a similar role and as a result the final recommendations made by the commissioners relating to these points are fitted comfortably into the section relating to temperance. The commissioners recommended:

> That the means of instruction and recreation be extended to meet the requirements of each station. That covered sheds for exercise and gymnastics be provided, and that gymnastic exercise be made a parade[287]

Diet and uniform were also noted as being of specific importance to maintain the health of the soldiers, with recommendations for food and clothing deemed more appropriate to the conditions of India being recommended.[288] These facilities also benefited the British soldier in India as it gave them an option other than simply remaining in their crowded barrack rooms throughout the heat of the day.[289] Moderation of diet in particular was noted as an important step in keeping British soldiers in good health, as it was argued that within the climate of India, a meat heavy diet which would provide good health in Britain would likely be a cause of ill health.[290] Many of these recommendations were justified through comparison with the actions taken by those people

[286] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.129.
[287] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.
[288] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.117 and p.113.
[289] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.132.
[290] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.114-115.

native to the area, the Diet recommendations being justified in this manner, the report noted that "the natives who are accustomed to the climate eat very little animal food, particularly in hot weather.".[291]

Latrines, Water and Hygiene

The examination of Latrines however fits more comfortably into the category of hygiene and stational cleanliness. The commissioners make a note that some latrines and urinals in older barracks are simply cesspits, cleaned from the outside, often by hand. Although they also stated that some newer barracks contained removable metal pans which allowed for better and more hygienic removal of waste.[292] The army's latrines in India were generally considered to be both unsuitable and unhygienic, often cleared only once per day and with insufficient water to flush away waste when necessary. The suggested measures to overcome these issues were the abolition of cesspits at all stations which were to be replaced with improved latrines with iron or earthenware containers which could more easily be removed and emptied. In addition to this, latrine buildings were to also be better constructed so that ventilation and light may be improved.[293]

Hospital construction

[291] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.114.
[292] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.111 and p.162.
[293] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.111.

Many similar issues were examined relating to the construction of military hospitals. These hospitals were constructed with the same defects which the commissioners identified in the construction of barracks. These hospitals varied greatly, as, like barracks, the regulated standard for their construction was very loose, as a result they could contain several wards or a single ward or multiple aisles of beds per room. The commissioners note that the size of wards could vary greatly, from as few as one or two beds at the smallest extreme, to over a hundred in others. At Trimulgherry in Secunderabad the commissioners state that there were two wards containing 228 beds each.[294] The size and scale of such hospitals also varied, wards could range from 25 feet in length at the smallest to between 60 and 349 more commonly. The longest ward which the commissioners were aware of was in Dinapore, which they claim was 633 feet in length, and little more than a corridor of beds.[295] As with barracks the commissioners discuss the hospitals in terms of the cubic feet and superficial feet per bed. To look at Trimulgherry again, the cubic feet per bed is given as having been 1000, whereas the superficial space per bed varied between as little as 24 feet and more commonly around 45 and 75.[296] The commissioners claim that within military hospitals in India, the average superficial area of space per bed was between 50 and 80 feet. This amount of space they considered to be insufficient and declared that Indian military hospitals were overcrowded.[297] The recommendation made to improve this issue was to establish a greater minimum amount of superficial space per bed.[298] Recommendation number 22, stated:

[294] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.135 – 136.
[295] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.136.
[296] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.136.
[297] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.137.
[298] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.137.

> That the cubic space in hospitals be fixed at 1,500 feet and upwards, and that the superficial area from 100 to 120 and 130 square feet per bed, according to the healthiness of the position; and that the wall space per bed be never less than eight feet. In existing hospitals the same space and area to be allowed."[299]

This expansion of space can be seen to be very similar to the expansion of space per man recommended for barracks and had similar implications regarding the transfer of epidemic disease.

As with Barracks, the problem of ventilation was also discussed with relation to hospitals. The recommendations made by the commissioners for the improvement of hospital ventilation were similar to those they made to improve the ventilation of barracks. These recommendations included raising hospitals to higher levels from the ground and increasing the space between beds.[300] The lack of proper facilities for ablutions within hospitals was of great concern within this report. The commissioners made clear that the facilities provided for the hygiene of patients were totally deficient. One example given was that of a hospital in Bombay, which provided only a single tin pot within the wards for patients to pour water over themselves for washing.[301] In other hospitals when there were baths available for the patients, the commissioners note that these baths were cold, supplied by water carriers and with the water generally being poured over a patient within a wooden tub. With regard to hospital latrines the commissioners make the

[299] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.169.
[300] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.138 and pp.167-168.
[301] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.138.

somewhat shocking statement that "There are no water-closets in any hospital in India"[302] and that "The arrangements are those of a camp hospital, and have long since been condemned in Europe."[303] Rather, there were 'night-chairs' in a small room adjacent to the ward, or privies around 30-80 feet away, connected to the hospital by a covered walkway, similar in deficiencies to barracks latrines. These latrines were often over cesspits, cleared once a day. The commissioners recommended a water closet for every hospital ward, as a necessary method of preventing the spread of cholera and dysentery by limiting exposure to "dangerous emanations."[304] They further recommend that patients have access to hot and cold water and basins and a bath for all sick wards.[305] Such great improvement in conditions on the part of the sanitary commissioners appears to have been rather ambitious. The reforms themselves were in part motivated by the cost of replacing sick invalided and dead soldiers and the cost of so great an endeavour as to provide hot and cold running water to all the military hospitals of India was likely to be prohibitive.

Hospital attendance

The report also noted that a key deficiency of military hospitals was the lack of trained and reliable assistants to tend to the patients. Although the hospitals had by regulation a number of staff who fulfilled a variety of roles, from nurses to apothecaries, cooks or sweepers, these workers were 'native' attendants or soldiers appointed to a hospital duty often only temporarily. This meant that very rarely were these individuals trained in sanitation or hygiene; Florence

[302] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.139.
[303] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.139.
[304] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.139.
[305] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.138.

Nightingale is mentioned by the report as stating that "there can be no doubt that natives, however kind they may be, if untrained, are not the class of attendants the sick want. The same applies to comrades from the ranks."[306] Indeed, Nightingale was not alone in complaints of this nature. The commissioners note that many stational returns criticised the untrained nature of hospital nursing which they had access to.[307] Although the commissioners did not think the introduction of female nurses in regimental hospitals would be appropriate, they did recommend that all hospitals be provided with trained hospital attendants and that female nurses be introduced into large general hospitals.[308] This specifically gendered separation in where hospital attendants can work in consistent throughout Nightingale's reports on nursing and the 1863 commissioners report.

Water was wanting for many tasks, not simply for the cleaning of latrines and urinals, but the commissioners also reveal that there was a general lack of accessible clean drinking water. The commissioners argue that in the vast majority of cases, when water supplies were chosen for cantonments and camps little if any analysis as to the quality of the water was undertaken.[309] Supplies of water were generally taken from shallow wells, tanks, or rivers. These shallow wells and water tanks were likely to become polluted by surface waste and so were not a pure water source. Water from all of these sources was drawn and transported by native water carriers or bullocks and carried in animal skins or occasionally in more appropriate containers. This water was then stored in wooden barrels for drinking, or specific receptacles connected to cookhouses

[306] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.141.
[307] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.142.
[308] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.142 and p.169.
[309] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.162.

and ablution rooms.[310] This water was not filtered and the commissioners make particular note of the potential impurities it could contain from both its original source, and from its transport in animal skins. Dr. R. D. Thomson and Dr Letheby are both reported to be very critical of the system of water gathering and storage, both noting in particular that the system of supply itself was objectionable. Dr. Thomson noted that were the water of his district of Marylebone to be of such dubious quality as that used by the Indian army, he would expect a much higher rate of mortality.[311]

Very little of the water at Indian stations had undergone any sort of chemical analysis or detailed examination, however the commissioners note that in the few instances where the water has been examined the results were quite disturbing. The analysis of the water at Secunderabad proved concerning as:

> This station (which has suffered so severely from bowel disease) is supplied with water from six sources, containing from 10 grains up to 38, 44, and in one instance 119 grains of solid matter per gallon; and of this amount it appears that organic matter of some kind or other exists to the extent of from above 2½ grains to 8, 11, and apparently in one instance, up to thirty grains per gallon.[312]

This content of organic and solid matter per gallon was of very real concern, as it was considered that impure water could be a vector for disease. The commissioners note that there was

[310] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*. p.87.
[311] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.88.
[312] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.89.

insufficient detailed information regarding water supplies to be of any real use from the stational returns. This was because they generally listed water supply as either good, tolerably good or not so good.[313] The quality of water allowed in India differed greatly from that allowed within Britain; Dr Angus Smith is remarked within the report as claiming that:

> three grains of peaty matter could hardly be considered bad in a sanitary point of view, half a grain of putrefying matter "might be intolerable" and that water containing from five to six or ten grains of organic matter per gallon could not, he believes, be drunk, and could not be used at all.[314]

When looking at organic matter quantities of up to thirty grams per gallon in India, the commissioners established that the quality allowed in India would under no circumstances be allowed to be used in any home station.[315] An appropriate summation of this mode of thought is given by Dr Sutherland:

> The present condition of the water supply is one of the cardinal defects in the sanitary arrangements of India, and that it is unquestionably a predisposing cause of disease, especially during the prevailing seasons of cholera, fever, dysentery, and other zymotic diseases.[316]

[313] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.189.
[314] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.94.
[315] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.94.
[316] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.94.

The commissioners examined the state of British wells to lend credence to their opposition to certain characteristics of Indian wells, particularly their depth as most wells used in India were characterised as shallow. Dr Letheby is again cited arguing that "there is no shallow well at all in London which contains pure water."[317] This opposition to shallow wells is further supported by the examinations of Dr Thomson who gives the impurity of shallow wells at between 44 and 133 grains of solid matter and 5 – 33 grains of organic matter per gallon.[318] Dr James Bird, regarding the state of the wells of Bombay, noted that they contained a large amount of organic matter, and that the water tanks themselves "receive the drainage of the whole surrounding area, and during heavy falls of rain, whatever impurities there may be on the surface are washed into the tank, which is in fact the drainage outlet."[319] Such a system of water management was rightly identified by the commissioners as needing reform. The stored water they noted was generally stagnant and of poor quality to begin with, before being further exposed to pollution from the areas surrounding them. Much of this is attributed to a lack of sanitary habits among the local inhabitants.[320] The commissioners were in almost total agreement that this poor quality water is a strongly linked to cholera, dysentery and diarrhoea, and indeed they also link poor water quality to intermittent fever. Again, drawing reference from British public health, the commissioners make note that with significant improvement in quality of water, the severity of cholera epidemics in Britain was greatly decreased, and similar action in India could have a similar result.[321] The commissioners recommended that all existing water sources be analysed and that

[317] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.89.
[318] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.89.
[319] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.90.
[320] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.91.
[321] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.92-93.

those which prove to be unhealthy be rejected, that the previous method of drawing and transporting water be stopped wherever possible, and that all drinking water be filtered.[322]

Some stations were considered unhealthy due to their proximity to unhealthy cities. The commissioners made note that in some cases, improving the sanitary state of the European areas and cantonments would not significantly improve the health of soldiers as they would still be susceptible to the poor sanitary conditions of the surrounding city.[323] This was considered in terms of both environmental issues, such as contaminated surface water and the dangers of effluent, and also the dangers of interaction with a potentially unhealthy native population. Sir Ranald Martin noted that at Calcutta (Kolkata)

> he was always aware of the advent of cholera some 15 or 20 days before it attacked the European population, by its prevalence among the natives, and that this was one of the reasons which led him to suggest sanitary improvements for Calcutta[324]

The sanitary state of Indian cities is identified as one of the primary vectors of disease by this commission, many examples are given of unhealthy cities. This resulted in the recommendation of a reform in public health so that the health of the British soldiers in India could be further protected. Madras was also noted for its poor sanitation, the report making particular note of the weaknesses of drainage in the city. This included concern regarding the open drain system,

[322] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.
[323] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.74.
[324] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.77.

which was unable to be flushed and cleared regularly, this resulted in the domestic water supply of the city being corrupted and declared to be "partially deteriorated by offensive matter from the drains."[325] Bombay similarly was noted for its poor drainage and lack of public hygiene. Dr Haines is quoted as stating that in 1861 the 16,200 deaths among the population of Bombay were the result primarily of diseases such as smallpox, cholera and fever.[326] However, with regard to the problems of sanitation, the commissioners note that in many cases, these cities could be made healthy. In the case of Bombay it is noted that "there is no reason why Bombay should not rank among the very healthiest of tropical cities"[327] particularly in light of the favourable circumstances from which the city was noted to benefit, particularly the sea breeze and excellent water supply. The report made clear that to achieve a healthy Bombay would have required widening of streets, an effective sewerage system and improved drainage.[328] Indeed, with regard to most of these unhealthy cities the report argues that the primary causes of unsanitary conditions are those created by man, either through poor city planning or poor sanitary practices.[329] The commissioners concluded that with appropriate sanitary regulation the health of the population could be significantly improved, and in doing so, the health of the European populations would also benefit. As a result of this the commissioners recommended that two officers of the Indian government be appointed in England, in order to better understand the knowledge gained from the English experiences. The intention was to share this learning with the sanitary service in India, so that a code of regulations be established relating to the specific circumstances of the Indian Sanitary service.[330]

[325] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.78.
[326] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.79.
[327] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.79.
[328] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.79-82.
[329] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.80.
[330] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.170.

In addition to the economic and imperial incentives to carry out a series of sanitary reforms, the commissioners draw parallels with the efficacy of reforms in England. The commission notes that before sanitary reform in Britain, many diseases were just as prevalent in the cities of Britain as in India.[331] Only after significant reform in sanitary systems and public hygiene did these diseases decline to a manageable level. The primary issue regarding enacting substantive civil reform in India however, remained the cost. The changes required to improve the Sanitary state of many Indian cities included street widening, improving drainage over large areas of land, establishing an effective sewerage system, filtering water and a change in lifestyle for the inhabitants.[332] Achieving these ends however, was certainly beyond the scope of this particular commissioners' report, and as a result, rather than specifically stating what should be done to improve public health within India, the commissioners recommended the appointment of a commissioner for public health for each presidency.[333]

Efficacy of reform

It still remains to discuss to what extent the recommendations of this commissioners' report were enacted within India, and how successful they were in improving health. There is certainly evidence that some aspects of the proposed reforms were introduced within India. Although it is difficult to establish the extent to which they were enacted, as a result of the scope of the area within which reform was proposed. Upon examining various reports relating to the health of the

[331] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.40.
[332] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.79-82.
[333] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.170.

British army in various regions of India, it is clear that some attempt at complying with these recommendations was made. Reports such as the 'Reports Military Cantonments and Civil Stations in the Presidency of Bombay 1875-1876' and 'Vital statistics of the Bengal Presidency Sickness and Mortality in the European army of the Bengal Presidency from 1870 – 1879' reveal the efficacy of reform in through analysis of statistical returns and sanitary reports contained within.[334] The reforms enacted were not universal within India, there were many inequalities regarding the extent of reform within different areas and regions. This is in part because of the cost of these reforms which was a constant issue. Many areas were not funded appropriately or able to generate sufficient revenue to enact all of the recommendations to the extent suggested within the 1863 report. This was often the case in civil areas, an example of this can be seen in the city of Lucknow where efficacy of reform was quite clearly divided between the more European side of the city and the Indian side.

Examination of the '*Report on Sickness and Mortality of the European Army between 1870-1879*' reveals that there had been significant improvement in the health of the British army in India. This report reveals the various rates at which the soldiers of the British army in India were admitted to hospitals, their daily sick rates and the overall rate of mortality from 1870 – 1879. These figures are compared to those of the preceding period of 1860 – 1869. The particular example of the decrease in mortality within the Bengal Presidency can be seen in the below table

[334] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*.

taken from the report.[335]

Statement contrasting the sickness and mortality of the European Troops in the different provincial areas of the Bengal Presidency during the ten-year periods 1860-69 and 1870-79.

	Bengal Proper.		Gangetic Provinces and Oudh.		Meerut and Rohilcund.	
	1860-69.	1870-79.	1860-69.	1870-79.	1860-69.	1870-79.
Admission-rate	1821·2	1310·7	1614·6	1410·3	1576·5	1461·2
Daily sick-rate	69·6	54·3	69·5	66·3	72·8	68·5
Death-rate	29·57	14·43	28·59	20·06	26·61	18·31

	Agra and Central India.		Punjab.		Hill Stations.	
	1860-69.	1870-79.	1860-69.	1870-79.	1860-69.	1870-79.
Admission-rate	2169·3	1530·1	1740·7	1847·2	1060·5	1041·9
Daily sick-rate	74·1	61·5	50·7	62·9	49·5	47·9
Death-rate	38·48	18·41	25·24	20·71	14·78	12·23

Figure 4 Sickness and mortality of the European troops

The death rates throughout the region of Bengal are revealed to have decreased by the period of 1870-1879. Even the death rate at hill stations, generally already presumed to be healthy, can be seen to have decreased. Indeed, not only has mortality decreased, but so has the rate of hospital admission and the daily sick rate in all of these regions except the Punjab. The regions labelled 'Bengal Proper' and 'Agra and central India' are shown to have had the most dramatic reductions in mortality, Bengal proper dropping to the lowest rate other than that of a hill station. This provides clear evidence that the overall health within this region had improved since the publication of the 1863 commissioners' report. This evidence alone does not necessarily show

[335] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.2.

the efficacy of reform, as it does not reveal the extent to which reform occurred within this region. This report claims that a key reason the mortality rate of Bengal Proper decreased within this period is due to the improvement of Fort William. Fort William being the facility within which half of the soldiers in the region were posted. The rate of mortality within Fort William had fallen from 25.19 per 1000 to 10.78 per thousand between the two periods. At many of the previously unhealthy stations within Bengal, the rate of mortality was dropped significantly.[336]

This death rate was not a gradual progression in decline of mortality either, as the final year of the period had the highest rate of mortality, due to both an epidemic of cholera and military action in Afghanistan. Outbreaks of conflict and epidemic cholera created significant variance in the rate of mortality throughout this period.[337] Deaths from cholera decreased between these ten year periods, down from 9.24 per 1000 to 4.18 per 1000 in the second period of ten years.[338] This report also mentions various fevers, however, much like the earlier report, the classifications prove problematic. Death from Enteric fever, for example, was noted by this report to have increased slightly between these periods. This figure is not necessarily very accurate, as this report itself notes. Enteric fever, this report argues, was often previously categorised as chronic diarrhoea, an ailment which was made note of in the 1863 commissioners' report. Additionally, this report notes that the statistics which they possess for enteric fever are "probably far from correct"[339] as there was no uniform diagnosis for enteric fever, as some doctors would diagnose a fever as remittent fever or simply fever.[340] Again the classification of various fevers, being

[336] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency,* p.2.
[337] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency,* pp.2-3.
[338] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency,* p.3.
[339] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency,* p.10.
[340] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency,* p.10.

varied and inconsistent, proves unhelpful. The overall rate of admission for fevers within the Bengal presidency is noted as having increased in the Punjab, Meerut and Rohilcund, but as having fallen within all of the other provinces.[341] Within the Madras and Bombay Presidencies the prevalence of fever is shown to be lesser. Within the Madras Presidency, this report notes that the mortality rate had more than halved between the two periods, and although the admission rate in Bombay was shown to be greater than that in Bengal, the rate of mortality was lower.[342] Diarrhoea and dysentery are also examined, both are revealed to have also decreased in prevalence dropping within the Bengal presidencies army from a death rate of 2.72 to one of 1.37 per 1000 for dysentery and from 0.75 to 0.12 per 1000 for diarrhoea.[343] In the Madras presidency, a the admission rate from dysentery and diarrhoea dropped significantly, within the Bombay presidency, rates of admission from these two illnesses actually increased within this same period, although the report notes that: "During the period under review Dysentery was thus less prevalent and less fatal in Bombay than it was either in Bengal or in Madras."[344] Hepatitis, which fits within the 1863 commissioners' reports category of 'diseases of the liver' is next to be discussed. Hepatitis is shown to have decreased significantly within Bengal, slightly within Madras and to have increased within Bombay.[345] In the 1863 commissioners' report, deaths associated with diseases of the liver, including *"*hepatic diseases", were often considered to have been classified as deaths from other illnesses, as they were frequently a complication to another primary illness.[346] As such, comparing the rates between the two ten year periods can be problematic. Hepatitis was considered the principle cause of death within the period of 1870-

[341] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.13.
[342] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.13.
[343] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.13.
[344] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.14.
[345] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.14.
[346] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.26.

1879 after cholera, with hepatitis accounting for 13.59 percent of deaths.[347] However, it is unclear whether or not this was due to more detailed examination and understanding of liver disease, or if there was a genuine increase from the earlier period. Overall, this report reveals that there was a significant improvement in the health of the British army in India during the years of 1870-79 when compared to its health in the years of 1860-69. This indicates that the reforms proposed in 1863 achieved some measure of good, as within all the presidencies the overwhelming trend appears to be a decrease in rates of mortality, and to a lesser extent a decrease in hospital admissions. Although in the case of some illnesses admission rates were shown to have increased. When examining cholera, a disease which now has a well-known cause which would certainly have been affected by the sanitary proposals made, the fact that even in light of several epidemics the mortality rate of cholera had decreased significantly, lends weight to the efficacy of these reforms. That said, the extent to which these reforms were enacted must still be examined.

The '*Reports on Military Cantonments and Civil Stations in the Presidency of Bombay directed by the Sanitary Commissioner in the years 1875 and 1876*' provide an excellent insight into the extent to which reform was enacted. These documents contain sanitary inspection reports, which include details of various cantonments and civil stations. This includes what was deemed in need of improvement, along with a response explaining how the issues revealed had been resolved, if indeed they had. Although this only reveals the scope of reform within the Bombay Presidency, it still grants significant insight into the manner in which these inspections were carried out by

[347] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.18.

the Sanitary and Medical Departments within India. In this way, it offers a snapshot of the probable processes occurring elsewhere on a wider scale.

The reports for the various cantonments vary significantly, for example the initial report regarding the sanitary state of the camp of Satara includes some thirty-three points, not all of which appear to be complaints. In contrast, the report discussing the cantonment of Belgaun includes 74 points, many of which are serious complaints regarding the sanitary state of the cantonment. Unlike the response from the camp at Satara, which contained solutions to the issues raised in the initial report, the response to the Belgaun report is primarily a request for the funds required to carry out any such improvements. The first response to the Belgaun report contained only eight points, of which none note that any action was being taken. The report on the cantonment at Satara shows that this camp had achieved several of the recommendations set out by the 1863 commissioners' report. The report notes that drainage had been improved at one barrack, the result of which was a significant reduction in fever among its occupants, who had previously been quite unhealthy.[348] Additionally, the cleanliness of the urinals was noted, as well as that of the latrines and the existence of a separate ablution room, although there remained some issues with wasted water being left to drain into the earth.[349] The state of the well was mentioned favourably, although no acknowledgement of filtration was made.

The number of soldiers quartered at the station of Satara is listed as two companies of the 2nd regiment of the 1st battalion and the headquarters of the 4th Rifles, at a strength of 156 and 350

[348] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* p.1.
[349] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* p.1.

soldiers respectively. These men were housed within five barrack buildings, with an additional building for married men. One of these barracks was undergoing repairs which left the remaining barracks crowded.[350] Although it appears most of the facilities and services used by the European troops were generally found to be in good order, those used by the Indian soldiers are revealed to have been much less so. The report criticises the building which was being used as a hospital by the native troops while their own hospital was being used for the European soldiers. There was also concern relating to water supply, as this was sourced from wells which would dry up in the summer resulting in a journey of some distance to get fresh water. Accommodation issues centred on the small spaces allotted to the native troops, their accommodation being noted to possess very poor ventilation and although they were single rooms, possessing space of only 810 cubic feet each. In addition, the native latrines were also described as having been in an offensive state during the commissioners visit, although he does note that the latrines were of a removable iron pot style.[351] Overall the camp seems to have been in a better state than many others, the primary health concern noted by the commissioner being syphilis. The report recommended that a new camp be set up with newer buildings of a better design at Yuteshwur where the commissioner noted that a "camp for European soldiers could be formed, which could be made cholera-proof, syphilis-proof, and fever-proof".[352] If however, this could not be done, he recommended pulling down and rebuilding the native lines, and taking greater care regarding the placement of new barracks with improved drainage. In addition to this rebuild, he declared that it would be necessary to monitor or relocate a local village called Godoli, which he believed was

[350] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* pp.1-2.
[351] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* p.3-4.
[352] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* p.4.

likely a cause of disease in the area.[353] The response to these recommendations appears indicative of an effective system of reform, although one which suffered significantly from insufficient funding. The response to these suggestions, in effect, stated that although moving the camp or improving the surrounding villages would be ideal, that these options were either not worth the expense, or in the case of improving the area, were simply too difficult considering the amount of private land involved.[354] In spite of this lack of funds, sanitary reform can be seen to have been taken very seriously. Those recommendations which could be enacted were done so, many noted in the response were reported as having been completed already. The native huts which were considered to be in such a poor state were already being removed, improved surveillance regarding the state of the native latrine was enacted, plans for creating another well were underway and drainage was being improved.[355] These improvements, although a far cry from meeting all the recommendations of the 1863 commissioners' report, still reveal a marked improvement in sanitation within the army, and particularly, an increase in the understanding of sanitary difficulties.

The sanitary assessment of the cantonment of Belgaum took place in August of 1876, the first response is dated November of that year, and the correspondence regarding recommendations carries on until June of 1877. The final listed piece of correspondence is a response from the Quarter Master General's office, which again, responds to many of the initial sanitary complaints

[353] T. G. Hewlett, Report on the Camp at Satara, Sanitary Commissioners Office, Bombay, August 24th, 1876, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.* pp.4-5.
[354] The Quarter Master General to The Secretary to Government Miltary Department, 7th November, 1876, Army Head Quarters, Poona, No. $\frac{19-49}{4650}$ from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay*.
[355] The Quarter Master General to The Secretary to Government Miltary Department, 7th November, 1876, Army Head Quarters, Poona, No $\frac{19-49}{4650}$ from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay*.

by stating that there do not exist the funds required to resolve these issues. Although there appeared a willingness to enact the recommendations made, they appear to have simply been unable to do so, as their reply reveals:

> The Cantonment committee agree with the sanitary Commissioner in regard to the provision of additional latrines in the bazar; but, unfortunately, the cantonment fund is not in a position either to pay the cost of construction, or to maintain the necessary establishment for their conservancy.[356]

The lack of appropriate funds appears to be a regular concern for sanitary reform across India. Indeed, Lucknow, although largely successful in its sanitary reforms can be seen to have had similar issues. Veena Oldenburg reveals in '*The Making of Colonial Lucknow*' that many planned improvements to the city were hampered by a lack of finance, as some significant sources of revenue were instead redirected to the imperial treasury.[357] As a result of this some reform was a lot longer in coming than it may have been, although by 1878 much of this income was made available to the city.[358] It is worth note however, that even those aspects of reform in Lucknow which appear to have been successful, such as the regular maintenance and improvement of public latrines, appears to disproportionately have advantaged the European population of Lucknow and the areas which they inhabited in the Eastern sector of the city. The

[356] The Quarter Master General to The Secretary of Government, Military Department, 26th June, 1877, Quarter Master General's Oddice, Poona, No. $\frac{19-55}{2506}$. From *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay*.
[357] Veena Talwar Oldenburg, *The Making of Colonial Lucknow 1856-1877*, (Princeton, Princeton University Press, 1984), p.106.
[358] Veena Talwar Oldenburg, *The Making of Colonial Lucknow 1856-1877*, p.107.

work required for the more Indian western sector of the city often being overlooked and contracted out with worse results.[359]

The greatest spur towards reform appears to have also been the greatest weakness with regard to instituting reform. Where reform was too expensive it was often not pursued, or enacted to a much lesser extent than recommended. This in spite of the argument put forward in the 1863 commissioners' report that sanitary reform would lower the remarkable cost of replacing sick and invalided soldiers. There was also a clear imbalance regarding civil sanitary reform between those areas with a large European population and those with a primarily Indian population, as has been shown in both the case of Lucknow, and the area surrounding the camp at Satara. Many aspects of the 1863 report were not enacted; there appears to be little effort put into the filtration of water, or a scientific examination of the water sources used. The reports still remarking in simple terms that water was of good or generally good quality, rather than discussing parts per gallon of organic and solid matter. However, in spite of these weaknesses, it is clear by the decline in the rate of mortality and the detailed sanitary reports provided by the various camps and cantonments, that sanitary reform was still being enacted with significant effect. Examining the case of the cantonment at Ahmednagar, the number of significant improvements made reveal very real progress with regard to an improved sanitary state. These improvements included everything from the construction of masonry drains to carry away waste water, the removal of 'temporary privies' and the prohibition of cesspools near local roads.[360] The degree of effect

[359] Veena Talwar Oldenburg, *The Making of Colonial Lucknow 1856-1877*, p.104.
[360] C. A. Moore, 29th September, 1876, Ahmednagar, Memorandum No. 258 of 1876, showing the Sanitary Improvements introduced in the Ahmednagar Cantonment and Bazaars, since May 1874, by the Secretary, Ahmednagar Cantonment Committee, under sanction of the Cantonment Committee, from *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay.*

gained from the lesser degree of reform can be argued as a contributing factor for the incomplete sanitary reforms which occurred, as the lesser sanitary measures were sufficient to create a significant improvement in health. This particular conclusion is supported by the responses to the proposals made in the sanitary reports regarding Indian stations, as in several cases the response to sanitary recommendations argued that improvement was not important enough to justify the expense.

> with regard to paragraph six of the above, that the huts of the hospital subordinates might, with advantage, be improved; but, taking into consideration the very stringent orders on the subject of expenditure, the work is not deemed of sufficient importance to warrant the submission of an estimate for carrying it out.[361]

Such a response was not uncommon, and can be seen throughout various reports. David Arnold, in his work, 'Cholera and Colonialism in British India', notes briefly that the work of the sanitary commissioners did little more than reveal the extent of the issues surrounding epidemic disease, without being able to provide a method of prevention.[362] This analysis appears fairly accurate in terms of the ability of the sanitary commissioners to tackle the vast issues of sanitation in India, however, the primary issue would appear to be one of finances, rather than an inability to provide a method of prevention. Indeed, the achievements they made ought not to be written off so abruptly, as the health of the British army certainly did improve. The commissioners had a

[361] The Quarter Master General to The Secretary of Government, Military Department, 11th October, 1876, Army Head Quarters, Poona, No. $\frac{19-48}{4223}$. From *Reports on Military Cantonments and Civil Stations in the Presidency of Bombay*.
[362] David Arnold, "Cholera and colonialism in British India", *Past and Present*, no.113 (1986): p.145.

number of theories which, where enacted, led to a reduction in mortality as a result of epidemic disease. It is clear that what they lacked was the funding and the backing of regional governments and within their departments to enact these reforms. Unlike the reforms of the Crimea, the reforms of India did not have the same public will and support behind them to attract large sums of private money. Most importantly however, the attempt to reform the sanitation of India was a total reform of infrastructure. Although the theory advanced within the Crimean War was pivotal to the reforms of India, the nature of the reforms themselves were vastly different.

Chapter 5, Comparison of theory

"The war of the East, so full of instruction in military science, was not barren of medical teachings. Its field of observation, vast indeed, and often melancholy, furnished opportunities for submitting to decisive proof, and sometimes even for settling grave problems of hygiene, medicine, and surgery, which had until then remained in doubt." – Jean-Baptiste Louis Baudens[363]

An examination of the sanitary reforms which took place during the Crimean War and those proposed in 1863 for the British Army in India reveals a shift in sanitary thought, particularly within the military. Alongside the differences of location, climate, and conflict, these two reforms share a key similarity; they provide examples of both military and administrative responses to crises. The structure of these reforms reveals the advancement of the sanitary movement within this period. An examination of the clear, ordered and detailed structure of the 1863 report of the commissioners appointed to inquire into the sanitary state of the army in India reveals the degree of investment in both time and expertise that had been committed to this reform. This contrasts sharply with the last minute, ad hoc style of the Crimean sanitary reforms. Indeed, the organisational issues revealed in the statement from Andrew Smith, head of the British Military Medical Department, are shown to have been entirely overcome by the time of the publication date of the 1863 report. The discussion surrounding these two reforms reveals many similarities, but there are also marked differences. Although issues of ventilation, drainage and hygiene are discussed in both of these contexts, by the reforms of 1863 they are discussed

[363] L. Baudens, *On Military and Camp Hospitals, of the French Army*, p.2.

with authority, as opposed to being presented in a manner still seeking to establish such authority.

These two reforms occurred in very different contexts and their differences influenced the way in which any interventions could occur. The Crimean sanitary reforms took place during an ongoing, active campaign while the Indian reforms took place immediately after a period of conflict; as such, it may be argued that in the post conflict period there was simply more time to explore, espouse and enact their theories of sanitation. However, the simple fact that such reforms had not been put into place after any of the other Indian revolts of the period reveal that the change was also in understanding, not simply circumstance. Both reforms also show an advance in the use of medical statistics. The Crimean War marks the introduction of detailed collection of information, compared to the previous lack of objective data and a gradual realisation of the value this provided in understanding, measuring and anticipating medical threats. By the time of the Indian reforms, a system was established which incorporated regular collection of a range of data, including that specific to colonial sanitary reports, and in a format appropriate to reveal as much useful information as was possible. The outcomes of these reforms are also useful, in revealing the extent to which sanitary theory was accepted and respected during this period.

Structural variance

These two sanitary reforms differed significantly in structure. The Crimean reform as mentioned was a much less formal process, as, unlike the Indian reform, it was not characterised by a

lengthy set of instructions and recommendations being carried out. The reform itself was a somewhat haphazard response to issues as they arose, often occurring after the effects of improper preparation were keenly visible in the mortality rates. The sanitary reforms which took place among the British army in India however, were the result of a clear series of recommendations, compiled over a period of four years. The initial command to begin the Indian reform process was given by Queen Victoria as the 31st of May 1859,[364] the same month which some historians claim to have been the very end of the conflicts of the Sepoy Rebellion of 1857, as it is the month within which Oudh (Awadh) was declared free of rebels.[365] The timing of the beginning of this reform process was a response to the military crises which arose as a result of the Sepoy Rebellion and the fears of sickness rendering the British troops garrisoning India ineffective. The Indian report itself was published in 1863, after a lengthy period of examination, research and data collection.[366]

The beginnings of the Crimean sanitary reforms are not so clearly marked. The major documents detailing those sanitary actions taken to prevent loss of life were all written after the conclusion of the conflict. However, the notes of the *Medical and Surgical History of the British Army which served in Turkey and the Crimea during the War against Russia in the years 1854-55-56* were collected throughout the conflict, and particularly where they relate to individual regimental histories, the returns of the medical officers are quoted directly.[367] The writings of Nightingale on this topic also occur post war, and as such post reform, but she also utilises her

[364] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.5.
[365] G.B. Malleson, *The Indian Mutiny of 1857*, (New Delhi, Rupa Publications, 1998), p.270; Julian Spilsbury notes that mopping up occurred until as late as December of 1859, Julian Spilsbury, *The Indian Mutiny*, (London, Phoenix, 2007), p.347.
[366] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.7-10.
[367] *Medical and Surgical History, Crimea 1854-55-56, Vol. I. and II.*

personal records of the conflict, and in some cases the official reports of the *Medical and Surgical History*.[368] While the Crimean reforms appear to have developed in an essentially reactive manner, with responses following the recognition of individual problems, the Indian reforms can be seen as more proactive with a structured, anticipatory model looking at potential issues before they occurred. This model was more formal and official and was likely influenced by key reformers of the Crimean War, in particular, Florence Nightingale herself.

At the conclusion of the Crimean War, Nightingale on several occasions met with Queen Victoria, and also with many other prominent members of government and medical organisations.[369] The hero status which she achieved as a result of her actions during the Crimean War[370] allowed her to have a greater influence on policy, and her connections to Queen Victoria, who commanded the Royal commission to begin work in India cannot be ignored. Indeed, the directions from Queen Victoria coincide significantly with the issues that Nightingale identified within her own accounts, and her subsequent recommendations relating to the Crimean War. Areas of congruence between Nightingale's beliefs and the primary instructions issued by Queen Victoria relate to the importance of identifying rates of sickness and mortality amongst the soldiers serving in India, the causes for these rates, in terms of climate, conditions and disease, hospital and barrack construction, regulations and organisation relating to the sanitary medical service, and, most telling of all, a direction to "inquire into the Practicability of establishing a general system of Military Statistics throughout India".[371] Even with regard to causes, Queen

[368] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*.
[369] William J. Bishop, "Florence Nightingale's Letters", *The American Journal of Nursing*, Vol. 57, No. 5 (1957): pp.607-609; Judith Lissauer Cromwell, *Florence Nightingale, Feminist,* (Jefferson, McFarland and Company, 2013), pp.178-179.
[370] Lucy R. Seymer, "The Nightingale Jewel", *The American Journal of Nursing*, Vol. 55, No. 5 (1955), pp.549-550.
[371] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.5.

Victoria's request can be seen to specifically note those topics which Nightingale stressed at length: "We do order and direct you to inquire into the Causes of such Sickness and Mortality; whether as relates to Climate, Locality, state of Barracks, Drainage, Water Supply, Diet, Drink, Dress, Duties, or Habits of Troops."[372] The commands here issued clearly correspond almost entirely to those concerns of the British Public Health Movement, but more particularly to those recommendations made by Nightingale herself within her *Notes on Matters affecting the Health, Efficiency and Hospital Administration of the British Army*.[373] The call for a group of experts in sanitation to choose the grounds upon which an army made camp or established hospitals echoes a call from Nightingale. After describing the deficiency in the current regulations, which do not require a sanitary officer to approve barrack locations or hospital sites, Nightingale declares that: "The necessity of appointing some competent Sanitary officer, for consultation seems apparent, from what has been said*.*"[374] This is further supported in the recommendation of the 1863 commissioners' report which among its list of recommendations makes the specific point, "27. That trained hospital attendants be introduced into all hospitals, and that female nurses, under the new medical regulations, be introduced into large general hospitals."[375] Many of the 1863 report's recommendations closely correspond with the suggestions made by Nightingale in her own report, although those of the 1863 commission appear in a more detailed and expansive format.[376]

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[372] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.4.
[373] For the majority of Nightingales recommendations see Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* pp.521-546 and pp.562-563.
[374] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.534.
[375] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.169.
[376] For the complete list of final recommendations, see *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.166-171.

Environmental impact

An important difference between these two reforms for those undertaking to make recommendations and enact reform was that of climate. The concept that environment, whether geographical location, climate or quality of air could influence health was associated with understandings of disease process, and the developing theories of sanitation. It has been described at length that the climate of India had previously been considered to be unhealthy for an Englishman, however, an examination of the preconceptions which were held regarding the health of the physical environment of the Crimea reveals no such uniformity of thought. Within the *Medical and Surgical History of the British Army which served in Turkey and the Crimea*, the second section of the Appendix is dedicated almost entirely to this topic. However, within this section on climate and topography of the Crimea, the climate itself is rarely discussed in relation to health, indeed, the unhealthy elements of the environment are noted within the section of topography as specific marshy areas and the like. Several examples of unhealthy terrain are given, particularly one campsite of the 1st Coldstream Guards, which came to the attention of the Sanitary Board of medical officers, who noted a list of concerns, primarily relating to the state of the huts which were criticised for poor ventilation, 'accumulated filth' from the harbour and the proximity to the stables of the transport core and a Turkish burial ground.[377] This provides a notable contrast to the accounts of the climate in India, which typically were used to explain high levels of disease and illness, whereas the first element to be examined or blamed for poor health in the Crimea was the physical conditions in which the soldiers lived. "According to the popular notion, the mortality of the British in India is explained by the heat and strangeness of the

[377] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.20.

climate. Hot climates are believed to be hostile to human life, and to be especially deadly to the English race."[378] Although this argument from climate and conditions began with the premise that India itself was unhealthy for an Englishman, this notion was immediately challenged within the 1863 commissioners' report.[379]

As we have already seen, the commissioners appointed to inquire into the sanitary state of the army in India begin their task with a refutation of the idea that the climate of India itself was simply unhealthy.[380] The threat of the climate of India is examined in great detail, even after it is largely established that climate cannot be the only cause of death. The report argued that as there was a clear discrepancy between the rate of mortality between soldiers of different ranks and station within the same areas, that the difference in conditions must be the cause of varying mortality.[381] Noting the discrepancies in rate of morality between civilians, officers and soldiers, the 1863 report notes that:

> We have thus three classes of Europeans exposed to the same conditions of heat and malaria, presenting three quite distinct rates of sickness and mortality; a fact which

[378] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.60.
[379] The connection between race, climate and health was not simply a layman's perception of India as a brief examination of the 1863 commissioners' report may make it appear. The connections between the climate of India and ill health were part of established medical theory. The concept of acclimatisation to the conditions of India is discussed in detail within the 1863 report, however, a detailed analysis of this concept and why it was largely rejected in this report is beyond the scope of this thesis. For further reading on the medical connections being made between race health and climate, see Mark Harrison, *Climates and Constitutions: Health, Race, Environment, and British Imperialism in India 1600-1850*, (New York, Oxford University Press, 1999) and James S. Duncan, *In the Shadows of the Tropics: Climate, Race and Biopower in Nineteenth Century Ceylon (Aldershot, Ashgate, 2007).*
[380] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.40.
[381] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.65.

> indicates the existence of other causes of disease, operating with different degrees of intensity in each of the three classes.[382]

These differences in the class of Europeans serving in India reveal a difference in conditions within which the different classes of India lived. The civil servants and officers were living in more favourable conditions than those of the common soldiers whose much higher rate of mortality and sickness reflected the poorer conditions in which they lived.

The report also revealed that of the diseases which caused the greatest loss of life in India, these same diseases were previously a similar scourge in the then comparatively healthy cities of Europe.[383] In spite of this evidence, climate was still discussed as a major cause of illness, and several recommendations were made for lessening the threat of climate upon troops serving in India. One such recommendation being regular troop rotation from stations deemed unhealthy, through to hill stations in such a manner as to lessen the perceived detrimental effects of remaining exposed to the climate of lower India.[384] Conversely, the response to the climate of the Crimea appears to be positive. It is noted that the winter months in the Crimea could be unpredictable and of a great range of temperatures. However, there is not the same degree of discussion relating to 'unhealthy climate' as there was regarding the general climate of India. The climate is even described as "not only an agreeable climate, but contrary to the character of most warm latitudes, extremely healthy*"*.[385] The discussion of climate within the *Medical and Surgical History of the British Army which served in Turkey and the Crimea,* largely focuses on

[382] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.71.
[383] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.56.
[384] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.164.
[385] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.26.

specific events of the weather across various months. During discussion of various diseases, at which point the climate ceases to be described as healthy, although, when cause of disease becomes discussed, climate again becomes a focal point. During the discussion of rates of bowel disease, one cause is noted as being "exposure of the unseasoned soldier to the endemic agencies of a hot climate in the summer and autumn months; and 2nd, by the hardships, privations, and sufferings of a winter siege, carried on in an inhospitable climate".[386] Although climate was considered a cause for concern, and considered to be inhospitable at certain times, the overall approach taken by the British Military Medical Department in this case appears to have been that the climate of the Crimea was generally healthy. This contrasts starkly with the initial assumptions that the climate of India was unhealthy. This comparison is particularly interesting, as in both cases the conditions within which disease was prevalent are discussed, as is the climate, and while overall climate related issues are considered to have been a particular factor in the virulence of disease and epidemics, only in India does this appear sufficient to have given rise to the assumption that the climate overall was unhealthy.

A direct comparison of epidemic disease between these two vastly different areas can be somewhat problematic. However, there is still significant room to make this comparison, as long as the differences in conditions are first noted. In the conflicts which led to both reforms, supply was a primary issue. Within the Crimea, this was as a result of an ineffective commissariat, and during the Sepoy Rebellion of 1857, as a result of the trying circumstances and sieges within which the British army found itself. However, as the Indian sanitary reforms took place after the culmination of the conflict, the issue of supply lacked the same emphasis in the notes on what

[386] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.91.

was necessary to address. That said, one element of supply was given priority within both of these conflicts. This was supply of facilities which would enable the soldiers to survive the conditions which the individual armies faced. In the Crimea, this was supply of prefabricated huts, tents and other means of aiding the soldiers in avoiding the worst effects of the harsh winter season. In India, the emphasis was on creating facilities to protect the British soldiers from the detrimental effects of the hot weather and the sun. As a result of this, recommendations were made for covered walkways, exercise sheds, properly ventilated facilities and very specific building regulations for hospitals and barracks.[387] This difference in temperature is one of the primary issues which separate the two reforms, alongside the British perceptions of the relative health of the two climates. Another factor is the question of humidity, as within the 1863 commissioners' report, the humidity of India is also emphasised, with this being viewed as the manner in which organic matter could be transmitted to people, so causing sickness and disease.[388]

> But as far as relates to the influence of moisture on health, the actual amount of dissolved water may be taken as indicating the amount of organic matter in the air, of which water is the solvent and vehicle; and hence, although the relative amount of water in the air in India is less than it is in England, the atmosphere considered in relation to the effect of humidity on health, is more humid than it is in England.[389]

[387] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.166-171.
[388] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.60-61.
[389] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.60.

This miasmatic emphasis represents prevailing thought; however, within the Crimean medical report humidity is rarely noted. Humidity was discussed within the Crimean report, primarily to note that there was little humidity during the campaign, an example of this can be seen within the report's summation, which stated that by late 1855 there was "a great exemption from excess or duration of humidity, a most favouring circumstance towards the preservation of the excellent health the army had acquired"[390] The conditions of climate within which these reforms took place were entirely different, yet many of the same sanitary rules and suggestions can be seen to apply. These differences in climate and conditions reveal in some ways the varying nature of the sanitary reforms proposed, yet the general theory supporting these reforms for the most part remains the same.

Contrasting experiences of disease

The epidemic diseases which afflicted the British army prior to both of these reforms can be seen within both reports to have been categorised in much the same manner. The *Medical and Surgical History of the British Army which served in Turkey and the Crimea* dedicates large sections to several primary diseases, or forms of diseases, making particular note of recorded occurrences and often the conditions under which these various illnesses arose. The diseases which receive the greatest attention and the most writing upon them are divided into sections; section IV is titled cholera, section V, diseases of the Bowels, section VI Fever, section VII Scurvy, section VIII and section IX diseases of the organs of respiration.[391] Within the mortality tables of this report, causes of death are generally divided into the categories of, Wounds and

[390] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.33.
[391] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* pp.45-201.

Injuries, Cholera, Diseases of the Bowels, Fever, Diseases of the Lungs, and All other Diseases.[392] These particular categories can be seen echoed in the Indian 1863 commissioners' report, which divides primary cause of illness into the four categories of fevers, dysentery and diarrhoea, Diseases of the Liver, and Epidemic Cholera.[393] Diseases of the organs of Respiration are replaced with Diseases of the Liver, with Scurvy and frostbite not being listed at all as factors in India, due to difference in climate and supply. These minor differences still reveal the three primary illnesses however, namely, fever, dysentery and diarrhoea, covered in the Crimean report under the category of diseases of the bowels, and cholera. The rates of these illnesses in common then make the most relevant comparison, as they are common to the context of both reforms.

The fevers which afflicted the British army were approached differently in each of these two reforms. The term 'fevers' was used to imply a broad category that in practice related to a number of separate illnesses. Nevertheless, fevers are discussed in the *Medical and Surgical History of the British Army which served in Turkey and the Crimea* in much greater detail than in the 1863 Indian returns, which rather than discussing the nature of disease in depth, merely describes them, noting their miasmatic origins[394] and then progresses to attempting to explain preventative reform. That noted, the difference in description can be seen to have been the result of a question of scale; the report relating to the war in the Crimea, refers to specific courses of disease, over a limited period of time and in a very limited area. It would be unreasonable to expect the same detail to be applied to an area the size of British controlled India, over an

[392] *Medical and Surgical History, Crimea 1854-55-56, Vol. II.* pp.209-211.
[393] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.24-28.
[394] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.71-74.

indeterminate period of time. The *Medical and Surgical History of the British Army which served in Turkey and the Crimea* in its discussion of fever notes that the likely cause of increasingly virulent fever was:

> mainly due to the influence of climate and locality, to the duties which devolved upon the troops, the nature of their accommodation; and while the disease naturally assumed a more or less remittent form, in deference specially to the tropically assimilated character of the climate, and the position in which the troops were encamped, its additionally fatal character would seem to have been imparted, in some degree at least, by the same influences, and by the debilitating agency of a pestilential constitution of the air.[395]

This note of causes corresponds closely to those listed within the 1863 Indian report, which quote a definition from Sir Ranald Martin, stating that "remittent fevers are found almost everywhere throughout the East Indies"[396] and describes their causes in terms of proximity to marshlands, irrigations and various other water sources. Martin goes on to note that: "Of the various obstacles which bar the colonisation of the white man in tropical regions, and of the many causes which reduce the strength of our armies there, remittent fever is the principle."[397] Based upon these conflicting descriptions, it can be seen that the illnesses being referred to under the heading of 'fevers' within these two reports, are indeed separate illnesses. Although both referred to as remittent fevers, those described by Ranald Martin, are described more in terms of

[395] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.129.
[396] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India,* p.24.
[397] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India,* p.25.

"malarious fevers"[398] with their origins being described in terms of the bodies of water and humidity. That is not to say that the malarious fevers being here discussed would be what we now call the specific fever malaria, in every case, as the term malarious fevers refers to the bad air which was believed to have caused the illness. Those 'fevers' described in the Crimean Report are discussed as "low remittent typhus fever"[399] during their most virulent phase, and a particular note of cramped barrack conditions is made regarding their origins. In comparison, the accounts of Dr Chenu go into great detail regarding Typhus fevers within the French army in the Crimea. Chenu's accounts discuss Typhus Fever's prevalence within the French Ambulances, which later during the conflict effectively became hospitals, as they were rendered static during the siege of Sevastopol. There were considerable rates of disease and mortality within the French ambulances, and this sickness was described in terms of miasma, Chenu noted that:

> From October 1854 to April 1855 there were 51786 patients – wounded or sick with fevers, diarrhoea, scurvy – who were depositing miasmas, blood, pus and excreta that infected the ground, the sheets, the wooden structures and other material.[400]

The attribution of miasmatic discharges as the cause of disease among the French army here is another example of the misidentification of the origins of illness, in such a manner as to provoke responses which would nevertheless succeed in decreasing the severity of an epidemic. This difficulty, already identified in the categorisation of diseases as simply 'fevers' can cause

[398] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.
[399] *Medical and Surgical History, Crimea 1854-55-56, Vol. II*, p.130.
[400] Jean Charles Chenu, *On the Conservation of Armies on Campaign*, p.139.

significant issue with regard to developing an adequate understanding of medical statistics and figures during this period. This can be seen in particular as it is not always certain whether doctors mean the same thing even when they use specific terms within their records, indeed, as previously noted, what was categorised as chronic diarrhoea within the 1863 report, was classified as enteric fever by 1882.[401]

Fevers, although one of the most prevalent causes of hospital admissions do not represent the highest figures in terms of mortality within either of these reports, although amongst the French army of the Crimea they accounted for the greatest rate of mortality within the second winter.[402] In the Crimea, fever accounted for 31,204 hospital admissions, peaking in March of 1855 as 8.6% of the army. In terms of mortality, fever only accounted for 3,446 of the total deaths in the army, and its peak in mortality was in the February of 1855, when it accounted for 2.22% of the British army.[403] Within the 1863 report relating to the army in India, such detailed medical statistics are not available. This lack of figures is partially caused by the scope of India, and, as noted by the commissioners, the poor medical record keeping of the British military in India before the 1863 reform.[404] After this report was published and its recommendations were made relating to gathering more detailed medical statistics the amount of medical data collected within India can be seen to have increased greatly. Before this point, there is very little quality medical data, as can be seen when looking at the reports published much later which aim to reveal a picture of disease in India over a broad period of time. For example, in *A Geographical Survey of Cholera in the Madras Presidency from 1818-1927* the information available for the period of

[401] James L. Bryden, Arthur Stephen, *Vital Statistics of the Bengal Presidency*, p.10.
[402] Jean Charles Chenu, *On the Conservation of Armies on Campaign*, pp.139-140.
[403] *Medical and Surgical History, Crimea 1854-55-56, Vol. II*, pp.168-169.
[404] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.18 and pp.28-29.

1818-1869 is covered entirely within the first five pages of the 125 pages of the report, with the first map of disease spread beginning in 1866.[405] The rate of mortality associated with fevers within the 1863 commissioners' report states that out of every hundred deaths among the Europeans serving in the Bombay Presidency, between the years 1830 and 1846, that 23.054 of them were attributable to fever.[406] Although the 1863 report notes that there was a lower rate of mortality for fever admissions than for dysentery and diarrhoea,[407] unfortunately, without a figure including hospital admissions, the relative mortality rate cannot easily be established. Fever is noted to have been responsible for as many as 50% of all hospital admissions within the Bombay Presidency, however.[408] Although as a comparison here would likely be between two separate illnesses, this difficulty does not present a great issue.

Diseases of the bowels such as dysentery and diarrhoea are noted within these two reports as being a major cause of death. Within the Crimea, Diseases of the bowels, of which dysentery and diarrhoea proved by far the most virulent, are noted to have been the cause of some 55,765 hospital admissions, and 5,950 deaths in total.[409] Within the 1863 Indian report, dysentery and diarrhoea is shown to have been the greatest individual cause of death. Within the Bombay Presidency, dysentery and diarrhoea is shown to account for 32.441 in every 100 deaths.[410] Within the reports' initial description of dysentery and diarrhoea it is immediately noted that these illnesses are "intimately associated with tropical fevers"[411] as both were noted to occur in

[405] A.J.H Russel, *A Geographical Survey of Cholera in the Madras Presidency from 1818 – 1927*, (Madras, Government Press, 1929) pp.1-5.
[406] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.28.
[407] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.
[408] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.
[409] *Medical and Surgical History, Crimea 1854-55-56, Vol. II*, p.127.
[410] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.28.
[411] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.25.

similar circumstances. Ranald Martin is quoted as claiming that within the Madras Presidency between 1842 and 1848, there were 10,531 cases of dysentery and 9,182 cases of diarrhoea out of an army of 82,342.[412] The discussion surrounding dysentery within this report is focused upon the conditions within which the soldiers were living. Although initially, most of the accounts of various doctors used by the commission state that the key causes of disease in India are climate, intemperance and sexual disease,[413] it is further noted by Dr. James Bird that the miasmic influences which cause disease are countered and even removed by hygienic measures.[414] Ranald Martin further advances this perspective, noting that "of all the causes which go to foster and maintain epidemics, the ill selection of localities, the structural defects as to ventilation, drainage, cleanliness, and the personal habits of soldiers, are the important questions."[415] Similarly, Surgeon Major Grant is noted as stating that with regard to dysentery and cholera "the most influential cause of these diseases is overcrowding in barracks; and that in gaols he has observed the most appalling mortality from bad air."[416]

The prevalence of diarrhoea within India, even at hill stations, which were meant to be the healthiest locations in terms of climactic influence Grant claims to have been the result of a "neglect of ordinary sanitary arrangements."[417] This emphasis on conditions as the general cause of dysentery and diarrhoea was also present in the Crimean discussion of disease, although again, generally explained through miasmatic excretions. Early on within section V, Diseases of the

[412] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.26.
[413] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.71-72.
[414] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.72.
[415] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.72.
[416] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.72.
[417] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.72.

Bowels, of the *Medical and Surgical History of the British Army which served in Turkey and the Crimea* this point was made entirely clear.

> During the late war, affectations of the bowels obtained a degree of prevalence for eighteen months, unknown in our military annals, and for one third of that period presented themselves in an aspect more fatal than has ever been recorded. And while the causes to which the great extension of these diseases may be considered as mainly represented, 1st, by an epidemic or choleraic constitution of the air[418]

Other causes noted after this point include discussion of climate and the privations of siege. The *Medical and Surgical History of the British Army which served in Turkey and the Crimea* carries on to stress that the excess of mortality, was largely due to the privations suffered by the men.[419] This separation of cause of disease and cause of mortality from bowel disease is particularly relevant, as within both of these cases, the cause is listed to have been miasmatic and unhealthy conditions, but in only one of these is the cause of the high rate of mortality noted particularly as privation. That is not to say that diet, exercise and standard of living was not discussed in great detail within the 1863 Indian report, it certainly was, and the improvement of these facilities was discussed as a necessary part of overall sanitary reform. However, the emphasis on mortality from diseases of the bowels can be seen to have been placed not on privation within the Indian reports, but largely on barrack room overcrowding, lack of appropriate ventilation and a lack of hygienic measures. In the 1863 report Dr James Bird is quoted to illustrate this point neatly: "Diarrhoea, dysentery, and fevers have prevailed, and have been attended with great mortality…

[418] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.91.
[419] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.91.

from want of due precaution in the selection of sites."[420] The report goes on to discuss the habits of life among the soldiers as a primary factor in the ill health of the British army of India. In the Crimea, privation was considered to have been the cause of mortality, while within India habits of life and conditions receive this blame. Most tellingly however, the methods to counter this mortality remain the same, improvement of sanitary and hygienic measures.

Epidemic cholera's place as a shocking and sudden cause of death led to it being a major consideration of sanitary reformers, as a result it occupied a place of particular importance within these reports. The *Medical and Surgical History of the British Army which served in Turkey and the Crimea,* discusses cholera before discussing the other primary illnesses, and opens its section on cholera with this statement explaining why cholera was of such a great concern in the Crimean campaign:

> From time immemorial, fevers and the fluxes have represented the diseases of armies and of campaigns, and their occurrence in the present instance was merely remarkable for the amazing prevalence and mortality which, for a considerable period, they obtained. Hitherto, the appearance of cholera was entirely an exceptional occurrence, the pestilence containing itself to small bodies of troops in the camp… but seldom constituting itself an agent of widespread destruction. The history of the epidemic… is not the record of a mere passing visitation, but of a disease, which, at a very early date, assailed the army, and which, for a period of nearly two years,

[420] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.73.

> followed in its footsteps… at one time subsiding into comparative insignificance, and disappearing, to break forth gain with redoubled fury and destruction.[421]

This disease, as a major scourge of armies was, to the knowledge of the writers of this report, a new phenomenon. However, cholera proved to be one of the greatest causes of death to afflict the British army, in total accounting for 4,512 soldiers of the British army, and as many as 7,574 hospital admissions.[422] This mortality figure is higher than the rate of mortality attributed to fevers, although it is slightly lower than the number of deaths from diseases of the stomach and bowels.[423] Even so, cholera had a much higher rate of mortality than either of the other major diseases of the army. Cholera had a mortality rate of just under 60% of cases resulting in death, whereas comparatively, the rate of mortality from diseases of the bowel was just over 10% and from fevers just over 11%.[424] So although fewer may have died of cholera than of general bowel diseases, far more who were afflicted with cholera died than those who were afflicted with diseases of the stomach and bowels.

Cholera as a scourge at this period was certainly known within India. Ranald Martin's statistics of its virulence within the British army in the Bombay Presidency noted that between 1830 and

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[421] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.45.
[422] *Medical and Surgical History, Crimea 1854-55-56, Vol. II, Return showing the Primary Admissions, by Months, into the Hospitals of the Army of the East, from 10th April 1854, to 30th June 1856; also, all the Deaths which, during the same period, occurred in Regimental and General Hospitals, in Hospital ships, or Suddenly, or from Violence, with the exception of those which occurred in Action with the Enemy. Table A.*
[423] *Medical and Surgical History, Crimea 1854-55-56, Vol. II, Return showing the Primary Admissions, by Months, into the Hospitals of the Army of the East, from 10th April 1854, to 30th June 1856; also, all the Deaths which, during the same period, occurred in Regimental and General Hospitals, in Hospital ships, or Suddenly, or from Violence, with the exception of those which occurred in Action with the Enemy. Table A.*
[424] *Medical and Surgical History, Crimea 1854-55-56, Vol. II, Return showing the Primary Admissions, by Months, into the Hospitals of the Army of the East, from 10th April 1854, to 30th June 1856; also, all the Deaths which, during the same period, occurred in Regimental and General Hospitals, in Hospital ships, or Suddenly, or from Violence, with the exception of those which occurred in Action with the Enemy. Table A.*

1846, 10.320% of the deaths among Europeans serving in India were directly attributable to cholera.[425] Although perhaps not understood in the same light as an epidemic afflicting an army at siege, as was seen in the Crimea, cholera was still a significant concern. Indeed, as early as 1825 cholera was being discussed in relation to its effects on the armies of the British in India within the *Edinburgh Medical and Surgical Journal*.[426] This discussion related more to the geographic spread of cholera, rather than discussing mortality rates or estimates. That noted, within the 1863 reform, cholera was discussed as having been a well known and well established illness, noting that:

> This disease has been known to prevail as an occasional epidemic at different years, seasons, and places throughout India from 1774 to 1817; and there are authentic records of its existence in Batavia so far back as 1629.[427]

Cholera within the 1863 report is also described in relation to miasmatic origins, the account of Dr. James Bird as quoted within the report giving a detailed outline of the miasmatic causes of the disease:

> Cholera, as an epidemic appears mainly to owe its development and origin to miasmata, favoured by elevated temperature, and peculiar atmospheric conditions of climate; this development being greatly aided by preceding established conditions of filthy endemic situations, badly constructed and ill ventilated habitations, unhealthy

[425] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.28.
[426] "Exhibiting a concise View of the Latest and most Important Discoveries in Medicine, Surgery, and Pharmacy", *The Edinburgh Medical and Surgical Journal*: Volume 24, (1825): pp.185-188.
[427] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.27.

> articles of food and drink, producing predisposition to disease, aided by unhealthy trades, and depraved moral conditions of vice and poverty.[428]

This contrasts somewhat with the Crimean account of the disease, which, in much the same way as its account of fevers and diseases of the bowels, discusses cholera more in terms of tracing the course of disease through the two primary epidemics which beset the British army. The course of the disease and its treatment was also described in great detail, unlike the 1863 Indian report, which simply quoted Ranald Martins description, and rather than discussing treatment, focused entirely on prevention. The treatment suggestions made within the Crimean report were noted to have been entirely unsuccessful however.

> The treatment pursued was varied, and nearly every remedy that has been recommended was tried, but without success; in no instance which recovered, has any plan of treatment been of such decided benefit, as to enable one to say that it could be pursued more advantageously than another[429]

The great variety of treatments attempted reveals the experimental nature of the treatment of cholera within this conflict:

> In some of the cases which recovered, the opium enemata, combined with the acetate of lead, appeared to have been of service; and when the stomach ejected food and

[428] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.73.
[429] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.61.

> medicine, the injection to the rectum of strong beef tea, combined with opium, seems to have roused the vital energies, and have been of service in some cases.[430]

This experimental nature was not present within the 1863 Indian report, which although noting that in cases of cholera, patients either recovered quickly, or died quickly,[431] did not attempt to suggest methods of treatment. This would seem to indicate that the preventative nature of this report, particularly with regard to cholera, was a result, not simply of the initial instruction presented to the commissioners, but also of necessity as there was no suitable or effective treatment for the illness.

Within the Crimean report, cholera is also strongly linked with dysentery and diarrhoea, cholera being noted as a causal factor in the high rates of dysentery and other illnesses. The impact of the earliest epidemic of cholera in Varna is considered to have been every bit as much of a causal factor as the poor conditions faced by the army. It was also seen as a reason for many of those poor conditions faced by the army outside Sevastopol, as it rendered the army ineffective for the hard work required to make the conditions of the siege healthy. Indeed, it is explained as being the most important of the diseases which afflicted the army, not in terms of pure figures of mortality or hospital admission, but due to its causal role relating to other diseases.

> the influence and bearing of the disease cannot be correctly surmised from the mortality it caused, considerable as it is, or from the number of cases which occurred.

[430] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.61.
[431] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India: with Precis of Evidence*, (London: George E. Eyre and William Spottiswoode, 1863), p.27.

> In the last outbreak of the disease the concomitant diarrhoea was so prevalent as to place three times the number of men on the ineffective list than were admitted with cholera itself; and the constitutional debility which this ailment induced… rendered fever a more common occurrence under the application of the ordinary exciting causes, and imparted to both a deficiency of tone.[432]

This willingness to attribute nearly all the difficulties faced by the British army in this campaign to cholera is entirely consistent with the origins of the document. The preface to this document, written by the Director General of the British Military Medical Department Andrew Smith, noted that

> I was constrained to depend entirely on my own judgement, and I am warranted, I think, in believing that the provision I made would in no respect have been insufficient had not Cholera, in a severe form, a circumstance not to be foreseen, assailed the Army in July, and continued to prevail, with periods of intermission, nearly as long as the troops remained in the Crimea.[433]

Cholera and privation were, according to this report, the primary scourges of the British army within this conflict, and indeed, were roughly equal in blame.

> the most conspicuous features, were first, the unusual and disastrous part which cholera acted as an epidemic on two occasions in the army, and secondly, the

[432] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.85.
[433] *Medical and Surgical History, Crimea 1854-55-56, Vol. I,* pp.iii-iv.

> appalling losses which were incurred by hardships, privations, and exposure to which the soldier was subjected during the earlier period of the siege.[434]

This link between cholera and dysentery was not discussed with as much detail within the 1863 reform accounts, although by this point diarrhoea and cholera are discussed in relation to one another within most descriptions of either. An examination of the Precis of evidence attached to the 1863 report reveals this trend. Indeed, within this precis, it is entirely common to discover the words 'diarrhoea and cholera' together at the beginning of several of the accounts. Although in most all of these, they are explained independently of one another with relation to cause.[435]

The actions taken within the Crimean War to lower the rate of mortality, when contrasted with those suggestions made within the 1863 commissioners report, reveal significant mutual influence. This is particularly evident in terms of hospital and barrack organisation and administration. These similarities of reform indicate the influence of a growing trend of sanitary theory, and its application and assimilation within official military departments. Some specific examples of this can be seen within the recommendations made by these commissions, and by Nightingale. The simplest of these to compare is that of hospital organisation and administration. Although largely overlooked in the *Medical and Surgical History of the British Army which served in Turkey and the Crimea*, hospital administration and organisation was examined in great detail within the works of Florence Nightingale. As such it is from her that we look for details of British hospital administration during this conflict, and not the British Military Medical

[434] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.85.
[435] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India,* Precis of Evidence, IX. Disease and Mortality pp.240-247.

Department which was ultimately responsible for them. Nightingale, within her report, *Notes on Matters, Affecting the Health, Efficiency, and Hospital Administration of the British Army,*[436] argues that there were five primary issues with the British Hospitals at Scutari. These issues Nightingale lists as "1. Frightful overcrowding. 2. Want of ventilation. 3. Want of Drainage. 4. Want of Cleanliness. 5. Want of Hospital Comforts."[437] Nightingale highlights the Scutari hospitals as she considers their overall administration to have been a disaster, here deliberately opposing the idea that these deaths were caused primarily by the condition which the soldiers were in upon their despatch from the Crimea. Instead Nightingale argues that although poor condition was certainly a factor in the ill health of the men, the high mortality rate at military hospitals, was primarily due to these five factors, and the state of these hospitals. The issue of overcrowding among the British hospitals of the Crimean War, were claimed by the British Military Medical Department to have been "unavoidably enlarged, and extended beyond the limits sanctioned by experience, and yet withal, sometimes greatly overcrowded, and always too constantly occupied by a class of ailments which pre-eminently tend to vitiate the air."[438]

Nightingale does not accept that these conditions and the overcrowding of British hospitals was unavoidable, indeed, in her characteristic fashion, she goes on to explain exactly how much space ought to have been allowed per patient. Nightingale details specific examples of cubic feet allowed per patient at various hospitals, and the amount that is supposed to be available in military hospitals and barracks. Of these figures it becomes evident that hospitals in Britain tend to have a minimum of 1300 cubic feet per patient but up to as many as 2000, and that naval

[436] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army.*
[437] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.81.
[438] *Medical and Surgical History, Crimea 1854-55-56, Vol. II,* p.250.

hospitals allow for 1,200 – 1,500, compared with the military hospitals, which she lists as only 500 – 700 cubic feet per patient, and barracks at even less with a mere 300 – 500 cubic feet of space per person.[439] Nightingale noted that an allowance of 1,300 cubic feet of space per patient was acceptable, although only if there was sufficient ventilation to allow 2,000 cubic feet of air to be supplied to each patient each hour. In addition, the requirement of space per patient could not simply be space above the head, but must include space between each patient. This space between patients must also be greater than the regulation amount of space, which Nightingale noted was a mere two feet, and even such a meagre area of separation Nightingale notes, was regularly not adhered to within the hospitals of the Crimea.[440] Nightingale also noted the placement of beds within the corridors of the overcrowded hospitals, often two rows of beds per corridor. Indeed, Nightingale's opinion of the degree of overcrowding prevalent in the hospitals of the Crimea is best summed up with her statement that:

> Hoping that never again may be seen "allowed in the service five feet in width to each man," or about two feet between the beds, and especially not in war time, especially not in war epidemics, when it would be far better for the men, were they treated in the open fields than in such hospital space.[441]

These recommendations can be seen reflected within the 1863 Indian report, which also notes specific minimum cubic feet of space per hospital bed. Although this number noted is slightly higher than Nightingale recommended, at no less than 1,500 cubic feet of space per bed, and an

[439] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.83.
[440] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.86.
[441] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.87.

area of superficial space per bed of between 100 and 130 square feet, depending on the 'healthiness' of the location.[442] In addition to this, the report notes that within hospitals, there ought always to be at least four feet of space between beds, as a minimum of wall space per bed ought to be 8 feet.[443] The recommendations for hospital construction in an Indian context were considerably more specialised, as they were deliberately targeted towards the perceived risks of the Indian climate. As a result, these recommendations included raised hospitals, so that they were not able to be corrupted by miasmas emanating from the ground. There was also a proposal that hospitals, instead of being constructed as large buildings with multiple wards, instead ought to be constructed in the form of detached pavilions, each designed to hold no more than 24 beds.[444] Nightingale makes a similar recommendation after the culmination of the Crimean War, noting that the "true principle of hospital construction is that of separate pavilions, placed side by side, or in lines".[445] Nightingale goes on to describe the various benefits of different ways of laying out pavilion hospitals, and gives examples of where such forms have succeeded, and the weaknesses of other attempts. Many of the recommendations to prevent overcrowding made within the 1863 Indian report can be seen to directly draw their influence from the lessons learned within the Crimea. Indeed, when discussing hospital overcrowding at Dinapore, its state is directly compared to the poor state of hospitals at Scutari.

> This ward is 21 feet wide and 18 feet high, being, in fact, nothing but a very long narrow passage, like the Scutari corridors. Memorable in history for their

[442] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.169.
[443] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.169.
[444] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.169.
[445] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.477.

> immense fatality to the sick in them, owing in part to this long narrow construction.[446]

This almost offhand mention of the lessons learned within the Crimean War, which culminated no more than seven years prior to the publication of this report, as events 'memorable in history' reveals the extent to which the lessons of the Crimean War had been accepted.

Methods to prevent overcrowding were not the only way in which experiences of the Crimean War can be seen to have influenced military hospital organisation within India. One element of particular note is the establishment of a regular system of hospital orderlies and nurses. The recommendations of Nightingale at the culmination of the Crimean War reveal a great degree of focus upon the administration and organisation of hospitals. This organisation manifested in terms of permanent hospital staff, both orderlies and in the case of general hospitals, nurses, regular hospital supply through commissariat reforms and a more clear and efficient command structure.[447] These suggested improvements included healthier diets, and cleaner facilities and a permanent staff dedicated to fulfilling this role. Nightingale was very critical of the previous system of hospital orderlies, which generally consisted of soldiers told off from specific regiments who had the temporary duty of looking after the comfort of patients. Unfortunately, due to the arrangement of this system, these orderlies were not trained specifically for hospital duties, generally learnt on the job, and as they were not permanent staff, could be recalled by the regiment at short notice. In addition, those sent to perform hospital duties were often physically unwell in some manner, as the healthier soldiers were often kept within the regiment. The result

[446] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.136.
[447] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, pp.530-546.

of this system being that hospital orderlies were generally not suited to the variety of tasks required of them.[448] This led to several of the deficiencies which Nightingale noted at Scutari, including the poor cooking, poor standard of hygiene and insufficient laundry services.[449] In addition to the establishment of permanent hospital orderlies, Nightingale also suggested several additional roles to assist with management of hospitals, particularly to take on roles of the Hospital sergeant who realistically could not perform all duties assigned to him. These roles included an assistant ward master to manage both nurses and orderlies and medical care of patients, a dispenser to dispense medical stores, an assistant steward, and an appropriate number of orderlies.[450]

This expansion of hospital staffing and administration Nightingale later specifically discussed in the context of military hospitals in India. Within her *Notes on Hospitals*, published in 1862, Nightingale notes that military hospitals in India were slow in catching up to the standards of sickness cooking.[451] In addition to this lack of appropriate hospital food, Nightingale also discusses the great deficiency in medical care for the patients. Noting that rather than hospital attendance, soldiers tend to be put on 24 hour sick shifts, a duty generally not liked and often poorly carried out as a result. With severe cases of illness Nightingale states that soldiers are entitled to this guard from the ranks, a deficiency as she viewed it, as: "Every severe case, as has been stated, is allowed to have its comrade to itself from the ranks, *i.e.*, the case which requires the best nursing is to have the worst nurse."[452] The available nursing was noted as exceedingly

[448] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, pp.190-195.
[449] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, pp.112-120.
[450] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army,* p.189.
[451] Florence Nightingale, *Notes on Hospitals,* p.143.
[452] Florence Nightingale, *Notes on Hospitals,* p.144.

minimal, in some cases a matron was assigned to a complete battalion, but generally Nightingale notes that: "As to supposing that any nursing is required, the thing is totally out of the question. There are neither trained orderlies nor female nurses."[453] Indeed, Nightingale notes that within India although there are many native attendants known as ward coolies, she disparages both their skill, competence and motivation and states that they were not liked by the soldiers.[454]

Nightingale's recommendation for hospital administration here clearly mirrors that of the 1863 commissioners' report on the topic. Namely, that: "Wherever there are general hospitals there should be female nurses".[455] The 1863 commissioners' report argues a similar point, although it differs in some areas on the topic of hospital attendance. Within this report it is noted that the regulation attendants at hospitals in India include "nurses, bearers and sweepers"[456] as well as the 'sick guards' which Nightingale dismisses as of little value as "orderlies taken from the regiment".[457] The report does go on to note that the actual application of these regulations appears to be in no way uniform, and as such the numbers in attendance differ between stations.[458] The report notes that within India, the numbers specifically assigned to a battalion are much greater than would be assigned for the same number in Britain: "The regular establishment of a battalion at home would therefore consist of 2 serjeants and 7 or 8 privates, while in India the same battalion would have a regular establishment of 79, capable of being extended to 240 in hot weather."[459] This however, they note is primarily due to the need to transport water to the hospitals and the quality of attendance they specify is poor. Quoting 'Miss Nightingale's

[453] Florence Nightingale, *Notes on Hospitals,* p.144.
[454] Florence Nightingale, *Notes on Hospitals,* pp.144-145.
[455] Florence Nightingale, *Notes on Hospitals*, p.145.
[456] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.140.
[457] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.140.
[458] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.140.
[459] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India,* p.141.

Paper'[460] to illustrate that point, and continuing to note that although the hospital attendants in Britain are taken from the ranks, "when they are trained they cannot be returned to the ranks, except for misconduct or inefficiency."[461] As a result, these attendants can be viewed as trained permanent staff, as opposed to the untrained soldiers used for this role within India. The conclusion of this section, and the recommendation which was made with relation to the staffing of military hospitals was entirely in line with those suggested by Nightingale. The experience and fame which Nightingale gained in the Crimea makes evident its influence here, as the authority lent to Nightingale's words within this report is clear:

> Miss Nightingale, in her Observations, has made some excellent remarks on the present state of Indian military hospitals, and on their want of adaptation for the care and speedy recovery of the sick. She considers them rather as being like camp hospitals than as establishments adapted for permanent barracks or stations, and consequently deficient in many of the most important requisites for efficient nursing and treatment.[462]

Nightingale here is quoted as an authority on the subject of hospital administration, even at the military level. As such it comes as no surprise that the final recommendations of the report appear to be identical to those recommendations which Nightingale makes within her own reports. The authority given to the sanitary movement at this point is entirely clear.

[460] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.141.
[461] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.141-142.
[462] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.142.

Nightingale's recommendations relating to the organisation of military hospitals reveal themselves to have been influential throughout the entirety of the of the 1863 commissioners' report. A brief examination of Nightingale's hospital recommendations reveals this. Nightingale's recommendations include instruction that within India, the sick ought always to be placed above ground level, particularly in what she describes as "low, malarial districts"[463] in such a manner as to allow "a free current of air between the ward floor and the ground."[464] This corresponds clearly with recommendation 9 of the 1863 report, which states:

> That all future barracks and hospitals be erected on raised basements, with the air circulating under the floors, and that, in existing barracks and hospitals the floors be raised as much as possible, and a free current of air allowed to pass beneath them.[465]

Indeed, with almost all of Nightingale's 16 recommendations for the construction of hospitals within India, a corresponding recommendation can be seen to have been made by the 1863 sanitary commission appointed to inquire into the sanitary state of the Army in India. These suggestions include limiting the number of patients per ward, Nightingale noting of overcrowding that: "It is unsafe in Europe. It cannot be less unsafe in India."[466] Her recommendations regarding both cubic and superficial space per bed correspond with the 1863 report recommendation 22.[467] Her recommendations relating to appropriate design for ventilation in hospital wards and buildings in such a manner as to prevent unhealthy drafts can be seen in

[463] Florence Nightingale, *Notes on Hospitals,* p.150.
[464] Florence Nightingale, *Notes on Hospitals,* p.151.
[465] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.
[466] Florence Nightingale, *Notes on Hospitals,* p.151.
[467] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.

recommendations 9, 10, 11 and 14.[468] Those relating to the necessity of pure water, sufficient drainage and access to hot and cold running water within hospital wards alongside appropriate facilities for ablutions can be seen reflected in recommendations 8, 17, 19, 23, 24 and 25.[469] Recommendations made by Nightingale relating to improving cooking facilities and the diets of those in hospitals are seen in recommendations 18 and 26, of the 1863 report.[470] Even Nightingale's recommendations relating to the necessity of covered walkways to allow patients space to exercise and move freely can be seen within the 1863 report, as covered walkways are specifically mentioned in recommendation number 5.[471] Indeed, the only specific recommendations made by nightingale in her report which do not appear to have been taken up by the 1863 commissioners' report are those relating to administrative offices for wards, ward ceilings and her view that there ought to be specific convalescent wards for recovering patients.[472] In many cases these recommendations between the two reports are so similar as to appear merely to be paraphrasing one another, and although Nightingale was one of the sources of information for this report, the degree to which her recommendations appear within the 1863 report continue to reveal either the truly great degree of influence which she had, or some degree of uniformity of thought and theory within the sanitary professionals approached by and making up the commission.

The influence of the Crimean reforms upon sanitary knowledge is quite clear, these reforms allowed for both an effective field test of sanitary theory, and the compilation of evidence

[468] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.167-169.
[469] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.167-169.
[470] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, pp.168-169.
[471] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.167.
[472] Florence Nightingale, *Notes on Hospitals,* p.155.

relating to its efficacy. The result of this influence can be clearly seen within the 1863 commissioners' report relating to the sanitary state of the army in India. The arguments of the British Public Health Movement were accepted almost as a matter of course by the commissioners responsible for the 1863 report. Indeed, the previous theories regarding the relative effects on health of service within India are thoroughly challenged by the emerging theories which place a much greater emphasis on conditions than climate. The recommendations of the 1863 commissioners' report note that sickness was not an inevitable part of military service within India and also that the sanitary conditions of cities within India could very likely be improved to rival those European cities already reformed in health and hygiene.[473] In this way the commissioners reveal that reform is possible not simply within the Army, but within the general population of India. Indeed, the commissioners make clear that reforming the sanitary state of local populations would be necessary to preserve the health of the British army in India. The recommendations of the 1863 report include several large and detailed sections on the necessity of public health in India. The report itself culminates with recommendations to create entire departments devoted to this role, and to improve sanitary knowledge in a number of military and civilian arms of government.[474] The report recommended both that commissions for public health be established for each Presidency of India and that permanent medical officers be appointed to assist these commissions.[475] These commissions for public health were to include medical, sanitary, civil, military and engineering commissioners. Additionally, it was proposed that both engineers and medical officers ought to be made to undergo courses in sanitation and hygiene as a part of their training.[476] By the publication of the 1863 *Report of the Commissioners*

[473] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.51.
[474] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.170.
[475] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.170.
[476] *Report of the Commissioners appointed to inquire into the Sanitary State of the Army in India*, p.170.

appointed to enquire into the Sanitary State of the Army in India, it is evident that the commissioners had taken on the lessons learned within the Crimean War, particularly those lessons compiled by Florence Nightingale. This can be seen to starkly contrast with the views of the British Military Medical Department at the culmination of the Crimean War. Still slow to accept reform and new theories, the British Military Medical Department instead generally considered the woes and disasters of the Crimean War to be primarily the result of an unavoidable cholera epidemic, and a poorly performing commissariat.

Conclusion

Analysis of the available evidence indicates the significant successes of the sanitary movement through both its achievement in lowering the mortality rate among the British Army in the Crimea and in India, but also through the increasing influence it gained as a result of reform. The evidence of its success in lowering the loss of human life from preventable illnesses is very clear; the statistical returns of the Crimean War reveal the extent of this success. Such a drastic decrease in both mortality and hospital admission is the basis of the great reputation that Florence Nightingale and the sanitary movement earned through the course of this conflict. The improvement of the health of the British army in India is less immediately evident, although careful analysis of the medical returns of the period do reveal a significant decrease in mortality. This began following the actions taken to improve the living and working conditions of the British Army in India. Although the reforms in India did not achieve all that they were intended to, with many of the recommendations of the Sanitary Commissioners not carried out either universally or uniformly, the medical returns indicate that there was definite improvement. This lack of a similar degree of efficacy as had been shown in the Crimea can be attributed to a number of factors. These include the size of India, and the difficulty of applying the recommendations of the Sanitary Commission to the entire country, and the enormous cost of doing so. The improvement achieved from the limited application of sanitary recommendations appears to have been sufficient to reduce the degree of urgency with which sanitary reform was considered in India.

Both of these reforms accomplished their goal in the broadest possible sense, that is to say, the clear result of both of these reforms in sanitation, was a significant decrease in mortality from preventable illness. Alongside this evidence of success is the manner in which this success influenced further reform. The Crimean sanitary reforms were well within public view, the conditions of the British army in the Crimea being a large part of the media focus of the time, and central to discussion of the conflict. This public spotlight ensured that the successes were also noted, and led to the almost celebrity status of Florence Nightingale, seen as the chief reformer of the Crimean War. With her demonstrable successes during the war in the Crimea, and the collection of medical statistical data, the efficacy of methods of sanitary improvement were made clear. Nightingale's characterisation of the war in the Crimea as "the most complete experiment in army hygiene"[477] proves apt. The best ways of organising an army to prevent illness had until now been academic, and unproven; the Crimean War revealed the flaws in the existing system, and provided an opportunity for sanitary theory to be applied. The application proving as successful as it did, granted sanitary theory the authority evident within the report of the 1863 Indian Sanitary Commission, and so the 'experiment' revealed the advantages of the theory. The authority of sanitary theory was thus solidified by the war in the Crimea, moving it from a theoretical way to improve the health of armies in the field, to a practical and demonstrable way to reduce the rate of mortality. This influence carried over from the Crimean War to be a major influence on colonial military sanitation in India, where sanitary theory was again applied to further decrease the mortality within the British army, with some success.

[477] Florence Nightingale, *Health, Efficiency, and Hospital Administration of the British Army*, p.493.

The role of class is also revealed as a relevant factor relating to sanitary reform, as its influence can be seen in several elements of reform. These elements are revealed through the application of medical statistical analysis. Through use of data collection, the proponents of the sanitary movement were able to prove their claims by compiling rates of mortality and hospital admissions, the reasons for admissions, the diagnosis of disease, and the position of the individuals admitted. Analysis of this data revealed that the burden of disease was generally upon the lowest of classes, living in the worst conditions. As a result, the lower classes tended to benefit from reform in sanitation significantly more than higher classes. This benefit was a major part of the justification for public health. Through medical statistics, it was revealed that the labouring populations suffered from preventable illnesses at a far greater degree than other occupations and classes, and their rate of mortality reflected this. Within the military structure this class divide is revealed through the differences in hospital admission and mortality rates between the various occupations and ranks of the soldiers admitted. The medical data showed that officers proved to be the least impacted by diseases caused by poor sanitation. This was not where the imbalance lay entirely, however, as the cavalry also tended to have a lower rate of mortality and infection than the infantry, whose rate of mortality was the highest. The class divides between these services are clear, the cavalry being much more prestigious than infantry, and the officer class being invariably drawn from wealthy and generally landed gentry. This evidence allowed the sanitary thinkers of the time to draw connections between the poorer conditions of life faced by various classes and the extent to which they are affected by illness. This evidence supported the environmental approach to disease prevention espoused by the sanitary movement. As a result, class and statistical analysis are revealed to have been key

elements that contributed to the success of reform by providing evidence of difference in health between those in different conditions.

The sanitary reforms of the war in the Crimea and those proposed in 1863 relating to the health of the British army in India were successful in reducing the rate of mortality in the British army. This success was justified through the use of statistical evidence and medical data to show the efficacy of an environmental approach to disease, improving conditions in an attempt to prevent illness, rather than simply treating patients.

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